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Analysis of health warning signs on alcoholic beverage packaging using the eye-tracking method

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ABSTRACT

Producers must mark packaging with various warning signs, including the harm of alcohol consumption. The most popular warnings inform about the required consumer age (e.g., "alcohol only for adults"), consequences of drunk driving (e.g., "don't drink and drive"), and advisable abstaining from drinking during pregnancy.

The study's main objective was to analyse the perception of warning signs on alcoholic beverage packaging using the eye-tracking method, which allows the observation and measurement of the focus of study participants. The research positively verified the ability to use the eye-tracking method to assess the perception of warning signs. The obtained research results were used to investigate the perception of warning signs placed on glass beer bottles. The study showed that the presence of pictograms (i.e., graphic symbols) does not guarantee the focus of potential buyers' attention. The obtained results clearly indicated that the efficiency of perception results from many elements, including the sign's placement, size and colours, a connection between graphic and textual information, and the colour of the packaging material and label.

The study's results can be useful for non-profit organisations and other entities responsible for the social marketing of alcoholic beverages. Moreover, the study could be seen as a starting point for researchers, beverage packaging industry representatives, and policymakers to test, introduce and promote packaging innovation solutions. The research filled the gap by providing a better understanding of the effectiveness of warning signs on alcoholic beverage packaging and furnished clues as to how alcohol stakeholders and public institutions should react to enhance alcohol health literacy in society.

KEY WORDS

eye-tracking technique, alcoholic beverage warnings, warning signs, perception of warning signs

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Introduction

Europe consumes the most alcohol in the world (11 litres of pure alcohol per person per year), which necessitates the investigation of alcohol drinking habits in European countries (Anderson & Baumberg, 2006; Cortes et al., 2016; Espejo et al., 2012; Glińska & Siemieniako, 2018; Guillemont & Leon, 2008; Kuntsche, Rehm & Gmel, 2004; Measham & Ostergaard, 2009; Popova et al., 2007; Ruutel et al., 2014; Siemieniako & Kubacki, 2013; Viner & Taylor, 2007). The direct costs of dealing with the conse-

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quences of harmful alcohol consumption are estimated to reach EUR 125 billion per year (Stewart & Wild, 2014).

The European Union (EU) strategy on alcohol was launched in 2006 to support Member States in reducing alcohol-related harm (European Commission, 2006). Informing, educating, and raising awareness on the impact of harmful and hazardous alcohol consumption was identified as one priority theme for action in the strategy.

In the United Kingdom (UK), the Campden and Chorleywood Food Research Association (CCFRA) studied the 2007 self-regulation agreement. Results showed that most manufacturers did not follow the agreed format and content of the labels. Only 2.4 % of the samples carried the Chief Medical Officer's (CMO) lower-risk guidelines in the agreed format (CCFRA, 2008). Alcohol Concern, the UK's national agency on alcohol misuse, surveyed the labelling of alcoholic beverages in the UK. The results are worrying and show limited interest from many producers on this issue (Velleman, 2011). So far, no research is available investigating the impact of such labels on drinking behaviour in the UK.

Consumers need to be provided with proven information on the negative health effects and consequences of alcohol so that they can take precautions to lessen the risk. As part of broader health policies to reduce alcohol-related harm, health messages on the labels of alcoholic beverages can be an effective measure to raise awareness of the risks related to alcohol consumption.

The study aimed to analyse the perception of warning signs on the packaging of alcoholic beverages using the eye-tracking method. The eye tracking method is used to research the packaging of different products groups, e.g., dietary supplements (Kabaja, 2018), energy drinks (Cholewa-Wójcik, 2016), shower gels (Cholewa-Wójcik & Kawecka, 2015), and tobacco (Kessels & Ruiter, 2012; Maynard, Munafo, & Leonards, 2013; Sussenbach, Niemeier, & Glock, 2013). Research on the packaging of alcoholic beverages is also found in the literature (Escandon-Barbosa & Rialp-Criado, 2019; Kersbergen & Field, 2017; Monk et al., 2017; Pham et al., 2018). The study aimed to explore the perception of warning signs communicating such messages as:

- alcohol only for adults,
- don't drink and drive,
- it is the safest not to drink while pregnant.

The relationship between the size, location, orientation, and colour of warning signs will represent the foundation for solutions and strategies to improve sign visibility and attention-catching. The study could be the starting base for researchers, beverage packaging industry representatives, and policymakers to test, introduce and promote packaging innovation solutions.

1. Literature review

Warning signs on alcoholic beverage packaging were researched from different perspectives and revealed different issues. Product labels are an important marketing tool that contributes to the image of the product. Moreover, product labels are one cheap and potentially effective way to inform consumers (Mackey & Metz, 2007). Alcohol labels have the highest exposure among the heaviest drinkers (Greenfield, 1997). In communication campaigns, the more channels are used to convey the message, the greater the likelihood of reaching target groups and strengthening the message through repetition. Food labelling falls under the Regulation (EU) 1169/2011. Labelling of wine, beer, or spirits is regulated additionally. These regulations govern the naming of alcoholic beverages and information given, e.g., on types of grapes used in the production or on the geographical origins of the product. The design and positioning of health warning labels are fundamental for their effectiveness (Regulation (EU) 1169/2011). Despite that, there is an ongoing debate among EU countries on issues that are linked directly to alcoholic beverage labelling regulations. In 2021, the European Commission launched Europe's Beating Cancer Plan, which is structured around four key areas. Among them, the EU proposed new alcohol policy solutions involving mandatory alcohol labelling for ingredients and nutritional value (European Commission, 2021). In addition, in 2022, Ireland notified the European Commission and the Member States of its plan to tighten regulations on the alcohol health warning labelling within its territory. The country intends to place information about a link between alcohol consumption and cancer or liver diseases on labels of alcoholic beverages, and this decision implements the regulations established through the Public Health (Alcohol) Act 2018 (Critchlow, Crawford & Jones, 2022). The decision was perceived as controversial by some EU countries and raised objections from the alcohol industry, but it was accepted by the European Commission (European Parliament, 2023). Based on

studies, the impact of health warning labels on drinking behaviour is shown to be insignificant (Agostinelli & Grube, 2002; Grube & Nygaard, 2001; MacKinnon & Nohre, 2006; Al-Hamdani & Smith, 2015).

On the other hand, many studies showed greater awareness among consumers of the risks highlighted in the warnings (Hassan & Shiu, 2018; MacKinnon et al., 2000; Stockwell, 2006; Wilenson & Room, 2009; European Commission & CRIOC, 2011). A study conducted in Australia, Canada and Poland revealed that adults are not sufficiently informed about alcohol and its effects on their health (Rundle-Thiele et al., 2013). The results from the Global Drug Survey (GDS) in 2018 showed that alcohol consumers are not aware of all the consequences of drinking alcohol, including the possibility of getting seven types of cancer, which was the least known fact (Winstock et al., 2020). Placing warning signs on alcohol labels and bottles might be one of the most important measures in raising public awareness of the harmful effects of alcohol. Such an opinion was confirmed, among others, by a national online survey in Australia (Miller et al., 2016).

In 2020, the Australian government introduced new requirements for mandatory pregnancy warning labels on packaged alcoholic beverages sold in Australia and New Zealand. Labels must contain the pregnancy warning pictogram, the signal words "Pregnancy Warning", and the statement "Alcohol can cause lifelong harm to your baby" (Australia New Zealand Food Standards Code, 2020). The deadline for producers to implement the new regulations is 31 July 2023. The studies in which authors test different formats of health warning labels in relation to their effectiveness in informing about the harmful effects of alcohol consumption are in line with these amendments and improvements (Grummon et al., 2023; Brennan et al., 2022; Hassan et al., 2022; Jones et al., 2021).

Information about the alcohol content is among the most important and should influence the lower alcohol consumption. In Germany, a study conducted by the Federal Institute for Health Education looked into the effect of the age limit label on alcopops. It showed that 17 % of alcohol consumers aged 12–17 renounced buying alcopops due to this label (Federal Centre for Health Education, 2005). For example, in Australia, alcohol standard unit labelling (1 unit = 10 g pure alcohol) of alcoholic beverages became mandatory in 1995. Tracking research found evidence of growing awareness of the "standard drink" concept since the introduction of the labels (Loxley et al., 2004). A study confirmed these results; however, the researchers found that the standard drink label helps young people to choose the strongest drinks at the lowest cost (Jones & Gregory, 2009). Also, in the US, a study among college students showed that the format used on labels to inform on alcohol concentration impacts the ability to accurately pour a standard drink. The traditional format that is used by producers (alcohol by volume, ABV) is less effective than a standard drink labelling for drinkers to enable them to track their alcohol intake and to facilitate responsible drinking purchases and behaviours (Brunk, Becker, & Bix, 2020). Based on a literature review, similar conclusions were highlighted by Kerr and Stockwell (2012).

Other studies focused on testing the effectiveness of different labelling types; however, findings on the impact of pictorial (image-and-text), text-only labels or non-labels have been mixed and do not unequivocally indicate the advantage of any of the forms of warnings (Staub & Siegrist, 2022; Jones et al., 2022; Clarke et al., 2021). Simultaneously, in some studies, researchers noticed that pictorial health warnings were associated with stronger emotions, such as fear of health risks related to alcohol consumption (Wigg & Stafford, 2016).

In Italy and France, research was conducted among Generation Y consumers to investigate their attitudes towards different formats of health warnings on wine labels. The results showed little attention to alcoholic beverage labels in general and a low level of visibility of placed health warnings. As a result, the authors pointed to the ineffectiveness of health warning labels in changing consumption behaviour and affecting consumer awareness of alcohol harmfulness (Annunziata et al., 2019).

In the US, a series of experiments were conducted to analyse the factors affecting the perception and the noticeability of warning labels (Laughery et al., 2002). Fig. 1 presents the determinants of warning label perception identified in that research.

In a Canadian study, authors focused on different formats and texts of alcohol labels with cancer and pregnancy warnings and tested if they promoted more informed and safer alcohol consumption (Hobin et al., 2020). In Australia, an ongoing qualitative study is conducted by the Victorian Health Promotion Foundation (2009). Based on the results, health warnings should be factual and informative. Other most relevant results are as follows:

- labels linked with existing media campaigns are most likely to be effective,

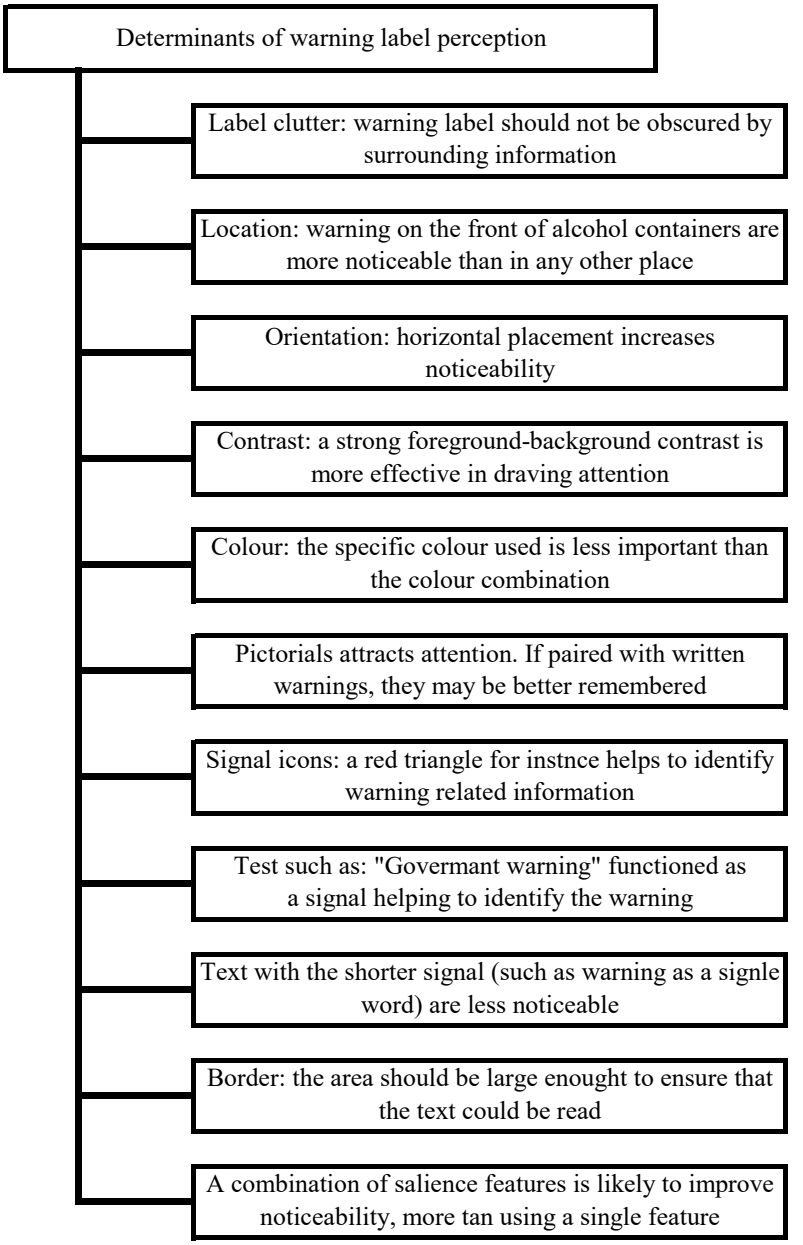


Fig. 1. Determinants of warning label perception
Source: elaborated by the author based on Laughery et al., 2002.

- included images are more effective if they are linked with other elements of a social marketing campaign,
- messages should not tell the consumers what to do.

Participants with personal bad experiences of their drinking behaviour are especially reluctant to these types of messages. "Health Warning" was the most preferred wording. A series of qualitative studies were conducted with youngsters from six EU countries in the framework of the Protect project (European Commission and CRIOC, 2011). The results showed that if health warning labels were to be used, young people would be more receptive to a combination of pictures and informative texts, such as "Alcohol increases the risk of breast cancer". In eye-tracking studies, researchers draw conclusions that a pictorial form has a greater impact on respondents. Research conducted by Monk et al. (2017) and Pham et al. (2018) proved that images in alcohol warnings appear beneficial for drawing attention. Dwell times were significantly higher for the image as opposed to

the text, which was also studied and confirmed by Kersbergen and Field (2017). Moreover, the size of warning labels and types of colours had a positive impact on drawing attention (Sillero-Rejon et al., 2020).

Researchers use an eye-tracking method to examine various aspects of warning label designs. Thomsen and Fulton (2007) used an integrated head–eye tracking system to investigate whether adolescent readers (aged 12–14) paid attention to responsibility or moderation messages included in printed advertisements for alcoholic beverages included in magazines. The results showed that these messages were the least frequently viewed areas of advertisements, both textual and visual. On the contrary, Monk et al. (2017) and Pham et al. (2018) proved that images in alcohol warnings appear beneficial for drawing attention. Dwell times were significantly higher for the image as opposed to the text, which was also studied and confirmed by Kersbergen and Field (2017). In France, researchers used an eye-tracking method to investigate the potential influence of pregnancy warning label designs on women's attention and alcohol product choices. In general, the results showed that French warning labels currently placed on the bottles attract no attention from study participants. However, if labels were larger and colourful, combining text and pictogram, they would attract far more attention (Lacoste-Badie et al., 2022). In Australia, two studies were conducted to investigate the market's attention to alcohol warning labels and examine whether that attention could be enhanced by changing the colour and size of warning labels. The authors used a self-report survey to measure attention and an eye-tracking method to examine whether respondents paid attention to the size and colour of warning labels on alcoholic beverages.

The results of the studies utilising eye-tracking provide valuable guidance for developing more effective health warning labels on alcoholic beverages. However, Kokole et al. (2021) indicated that most reviewed studies were conducted online or in a laboratory setting and not in the real world.

The research results referred to consumer behaviour and the role of warning signs on alcoholic beverage packaging. In this context, the in-depth analysis of those studies formed the basis for investigating the literature on warning signs placed on the packaging and consumer perception. It revealed a lack of research and full analyses of consumer perception of health warning signs on alcoholic beverage packaging.

2. Research methods

The research concerned the perception analysis of warning signs on the packaging and their elements that may influence the focus of attention. The research subject was glass bottles of beer with alcohol content available in the European market offer. Visually differentiated packaging was chosen for the research (bottles varied in shape, glass colour, colour and layout of the labels, graphics, size, font type, ergonomic solutions, and different warning signs). The research subject is presented in Fig. 2. The eye-tracking method was used to research the warning signs on the beer packaging.

The study involved 25 participants from different age groups, women and men. The research was conducted in 2022. It was designed and conducted following widely accepted research guidelines (Carter & Luke, 2020; Duchowski, 2007).

The research used the eye-tracker Tobii X2-30 Tobii Studio, which consists of a camera and infrared projector embedded into a standalone display monitor. Participants look at an image projected on the monitor; the infrared projector creates a pattern of the viewer's eyes, with the camera taking images of the users' eyes and patterns. The research sessions were held in peace and quiet, without any distractions for the respondent. After calibration of the eye tracker for each participant, they were instructed to look at a series of bottle images. The research scenario provided for free viewing of the whole packaging. Each image was shown individually to the participant for 30 seconds before the poster was automatically changed. Each eye-tracking session ran for approx. 5 min. After finishing the experiment, participants were asked to fill out a four-question demographic survey.

This study recorded variables with the eye tracker:

- fixation count;
- first fixation duration;
- fixation count on the packaging;
- fixation count on the warning sign;
- time to the first fixation on the packaging;
- time to the first fixation on the sign.

Fixation count is the number of times a participant looks at a particular area of interest. Fixations are relatively constant positions of an eyeball involving small vibrations. It is assumed that a cognitive process (when information reaches the brain and is consciously processed) takes place during the fixa-

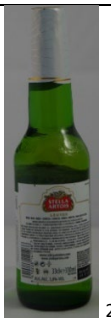
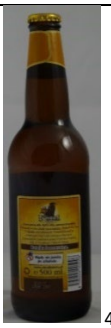
 1 It is safest not to drink while pregnant	 2 It is safest not to drink while pregnant Don't drink and drive	 3 Never drink and drive	 4 Never drink and drive
 5 Alcohol only for adults	 6 Never drink and drive	 7 It is safest not to drink while pregnant Don't drink and drive	 8 Don't drink and drive
 9 Don't drink and drive It is safest not to drink while pregnant	 10 Alcohol only for adults	 11 It is safest not to drink while pregnant Don't drink and drive	 12 It is safest not to drink while pregnant Alcohol only for adults Don't drink and drive
 13 It is safest not to drink while pregnant	 14 It is safest not to drink while pregnant	 15 It is safest not to drink while pregnant Don't drink and drive Alcohol only for adults	 16 It is safest not to drink while pregnant Alcohol only for adults

Fig. 2. Analysed beer packaging

Source: photographed by A. Kawecka.

tion. Fixation duration is the length of time in which the viewer looks at an area of interest, and time to the first fixation is the length of time it takes for a viewer to first look at an area of interest. Data for the variables are expressed in seconds. During data analysis, the area of interest was defined around the warning signs within the label for the eye tracker to determine if a participant looked at the warning labels.

The presented studies used an eye-tracking method as a technique allowing to obtain quantitative data. Measuring and physiological tests, based on the work of sight, allow for obtaining representative quantitative data and determining how certain visual layer elements of the packaging, such as warning signs, are perceived by potential consumers. The techniques used in this study focused on:

- perception speed of warning signs on beer labels;
- determining the difference in perception of only graphic signs and graphic signs with text;
- determining the relationship between the size of the sign and the time needed to find the sign;
- influence of sign colour on consumer perception.

Eye tracking helps understand the complete user experience, even if users cannot describe it. Eye tracking data helped explain the noted increase in attention during visual search tasks over the newly redesigned labels: lowered search demands or lowered information-processing demands posed by the new design.

Basic eye-tracking measures were used, such as scanning path, the number of fixations, or the total time of fixation. The achieved research results were presented in the form of heat maps, which are a dispersion of attention directed at the researched area of interest, with the possibility to distinguish noticed and omitted elements while scanning the sight. Heat map colours were used to show the average image of the packaging areas to which the respondents paid attention. Areas marked red received the most focus, and green was used for areas with the least focus. It shows the order of the sight activity of the respondents within the delineated area of interest (AOI) (Bergstromm & Schall, 2014).

3. Research results and discussion

Free looking of the respondents was analysed to identify the perception of health warning signs on alcoholic beverage packaging. The results of the sight perception analysis using eye-tracking measures is presented Table 1.

Tab. 1. Results of the sight perception analysis with the use of the chosen eye-tracking measures

Packaging	Eye-tracking measures								
	First fixation duration [s]			The time to the first fixation [s]			Fixation count		
	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
1	0.27	0.73	0.02	0.30	3.9	0.0	18.88	104	6
2	0.3	0.68	0.04	0.25	5.03	0.0	13.62	34	5
3	0.3	1.32	0.01	0.45	5.02	0.0	12.12	28	2
4	0.37	1.54	0.01	0.45	5.29	0.0	10.84	19	1
5	0.42	1.14	0.07	0.35	5.03	0.0	14.56	29	6
6	0.32	0.66	0.01	0.29	5.01	0.0	12.56	32	1
7	0.32	1.00	0.02	0.30	5.25	0.0	13.08	34	4
8	0.21	0.76	0.01	0.38	5.01	0.0	17.04	31	5
9	0.34	0.93	0.03	0.38	5.02	0.0	12.16	20	2
10	0.33	0.75	0.01	0.34	5.29	0.0	15.36	35	5
11	0.28	0.58	0.01	0.25	5.01	0.0	13.92	29	5
12	0.32	1.20	0.07	0.23	5.02	0.0	11.96	21	2
13	0.31	0.99	0.04	0.35	5.03	0.0	15.04	47	1
14	0.31	1.31	0.04	0.26	2.3	0.0	12.50	34	5
15	0.32	0.70	0.00	0.06	0.45	0.0	12.08	22	6
16	0.58	5.02	0.04	0.08	1.18	0.0	9.24	14	3

The analysis of the free-looking test results showed that all the researched beer packaging attracted potential consumers' attention. The sum of all fixations was in the range of 9.24 to 18.88. The fixation count depends on the number of graphic and textual elements on the packaging which attract attention (the largest number of graphic and lettering elements is the largest fixation count). In the case of the analysed beer packaging, bottle No. 1 received the most interest. This packaging had a lot of information and some graphic elements. The bottle also had embossed decorations. It had the biggest fixation count (18.88). This packaging was characterised as having great importance and was the most noticeable in the process of sight scanning for the respondents. The lowest number of fixations was noted for bottle No. 16, with a mean fixation count of 9.24. This packaging was much clearer. The form of the bottle is simpler, the label is more legible and easier to read, and the quantity of information is smaller than on bottle No. 1. A large difference was noticed in the easiness to read between those two labels because of the label background colour and font colour contrast. Also, legibility was influenced by the font size and the interline size.

The study confirmed the results by Mackey and Metz (2007). The research results showed a low time to the first fixation, which is from 0.06 to 0.45 s. Time to the first fixation depends on specific, distinctive elements that appear on the packaging, which attract sight in the first place (the more attractive element, the shorter time to the first fixation). The lowest time to the first fixation was noted for bottles No. 15 (0.06 s) and No. 16 (0.08 s). On both bottles, distinctive elements were areas with graphic sign clusters. Attention was attracted by labels with less text. The results of eye-tracking descriptive statistics confirmed that this packaging not only attracted the most attention of the respondents but was also noticed the fastest.

The interpretation of the first fixation duration supplemented the analyses of packaging perception. The first fixation duration is the time when respondents are looking at the first element that attracts their attention to the packaging. In the analysed case, the first fixation duration was in the range of 0.21 to 0.58 s. Bottle No. 16 was viewed the longest. The long viewing was due to the diversity of information (graphic and textual), different sign sizes, and the use of different colours. The shortest time was given to bottle No. 8. This packaging contained little text, and the shape and size of the signs were the same.

The perception was analysed to distinguish the packaging that attracts the most attention from potential consumers. It was based on the heat map analysis. The eye-tracking results are presented in Fig. 3.

The total variety analysis of the intensity of attention by using colour allowed for defining the level of concentration on the packaging from the highest degree of attention concentration (marked in red) to medium (marked in yellow) and small (marked in green). Explication of the respondents' sight activity based on the average areas of the packaging's image showed that in the case of all analysed beer packaging, the survey participants focused their sight mainly on the packaging elements which were highly persuasive. These elements may significantly influence a potential buyer by making certain impressions, which can be confirmed by the research results (Cholewa-Wójcik & Kawecka, 2015; Wright & Ward, 2008).

To check if warning signs are catching the attention of consumers in the first place, a comparison of descriptive statistics was done. Time to the first fixation on the whole packaging and on the area with signs was compared. If the time of the first fixation on the packaging is equal to the time of the first fixation on the area with the sign, it means that the sign was the first element of packaging that consumers looked at. The comparison is presented in Table 2.

On average, the time to the first fixation on the packaging was shorter than 0.5 seconds. The time to the first fixation on the area of signs varied. The measure was in the range of 1.60 s to 8.16 s. In the area of signs, the first fixation was always recorded much later than in other packaging areas. The fastest was noticed sign on bottle No. 7. Signs on this packaging were easily noticeable because the signs were white on the black label, and the glass was also very dark. The only white elements on the packaging besides signs were the brand name and the bare code. After 2.2 seconds, the sign on bottle No. 9 was also visible to respondents. The sign was easily noticeable because the field of view had very few elements, and the sign was in red, which is a very visible colour. This sign is a connection between the graphic and textual information. The signs on bottles No. 1 and No. 10 took the longest to be noticed. On both bottles, the signs were very small.

The results clearly showed that the time to the first fixation on the packaging is much shorter than the time to the first fixation on the area where signs

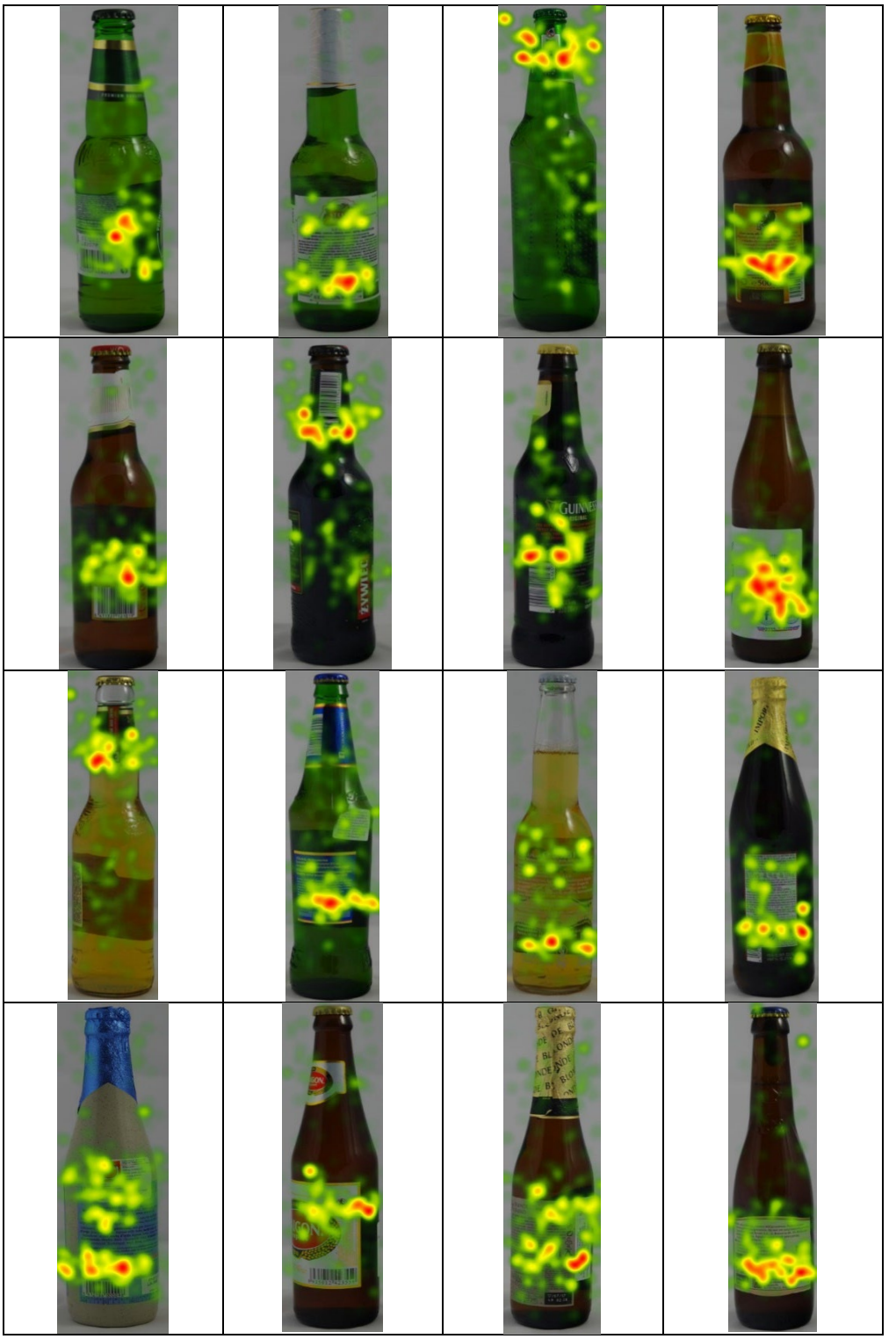


Fig. 3. Heat maps of the analysed beer packaging

are located. That means that signs do not grab consumer attention in the first place. To compare the overall rate of interest in a designated area of the AOI, the numbers of fixations recorded for the whole package and for the area with the sign were compared.

There is a strong relationship between the number of fixations and the length of time spent watching the area. The number of fixations is, therefore, an important indicator of viewing (both across the whole surface and its parts). The obtained results are presented in Table 3.

Analysis of the results showed that the packaging and the signs on it received diverse interest from the respondents. The fixation counts on packaging ranged from 9.24 to 18.88. However, signs on the packaging had fixation counts from 1 to 3. The sign on bottle No. 1 received the most interest, while the signs on packaging No. 10 received the least interest. The low number of registered fixations on packaging signs shows that consumers do not read the labels and do not pay or pay very little attention to the warnings. This may result from low consumer awareness and a lack of the ability to interpret graphic signs. Properly displaying the sign on the label in conjunction with the text and selection of appropriate contrasting colours can help to focus attention on it. The research results were the basis for the proposal concerning object perception and warning signs placed on the packaging. Perception understood as a process of sensory information identification, is hindered by difficulties defined as distractors.

Element perception is influenced by the object's ability to attract attention and distractors that may be internal or external to the packaging. External distractors are environmental factors independent of the packaging, such as consumers' personal attention deficits. However, other distractors are internal to the packaging, e.g.:

- Unsuitable packaging materials, which make it difficult to read the information (bottle No. 11 —the total time of fixations was short, as demonstrated by the heat map. This shows that weak legibility diverts the attention away from packaging).
- Very complex packaging, with a lot of different features and elements (bottle No. 1 — the fixation count was very high due to multiplicity of different elements such as more than one label, colour diversity of labels, lots of information in small font, ornaments, etc.).
- Unsuitable contrast between packaging, label background, font, and graphic information (bottle No. 4 — low fixations count of 10.84 is proof of little attention paid to this element).
- Unsuitable proportion of packaging, label, and information signs (bottle No. 10 — the biggest

Tab. 2. Perception results using the chosen eye-tracking measures

Packaging	Time to the first fixation on the packaging [s]	Time to the first fixation on sign or signs [s]
	Mean	Mean
1	0.30	8.16
2	0.25	6.72
3	0.45	4.85
4	0.45	2.65
5	0.35	3.79
6	0.29	3.61
7	0.30	1.60
8	0.38	4.08
9	0.38	2.20
10	0.34	8.27
11	0.25	4.46
12	0.23	4.18
13	0.35	5.07
14	0.26	3.59
15	0.06	3.47
16	0.08	3.15

Tab. 3. Fixation counts on packaging and sign areas

Packaging	Fixation count on packaging	Fixation count on signs
	Mean	Mean
1	18.88	3.00
2	13.62	1.75
3	12.12	1.83
4	10.84	2.19
5	14.56	1.83
6	12.56	2.62
7	13.08	2.11
8	17.04	1.58
9	12.16	2.04
10	15.36	1.00
11	13.92	1.11
12	11.96	1.25
13	15.04	1.57
14	12.50	1.25
15	12.08	1.33
16	9.24	1.56

subtraction between the total count of fixations on packaging and fixations on warning signs due to the small size of warning signs)
- Unsuitable placing of textual and graphics information (bottle No. 1 — the biggest difference between the time to the first fixation on packaging and the time to the first fixation on warning sign due to difficulty in finding a sign).

Conclusions

Warnings are an important element of the visual layer of product packaging. Their task is to warn about the threat, the source of which may be the product. From the point of view of public health, one group of extremely important warnings of consequences are placed on the packaging of alcoholic beverages, including beer.

Warning signs are the elements of social marketing. So far, they have been investigated using questionnaires or focus groups and eye-tracking methods in the analysis of perceptions. An eye-tracking method allows for supplementing research with objective knowledge obtained based on the analysis of the actual reception of the tested products, including packaging and their marking, not only the subjective opinions of the respondents, which was proven by Kersbergen and Field (2017), Monk et al. (2017), and Pham et al. (2018). This method makes it possible to determine the way consumers perceive particular elements of the visual layer of packaging (warning signs), as shown by Keyser et al. (2021) and Escandon-Barbosa and Rialp-Criado (2019). In addition, it allows for learning the perception patterns of potential consumers. The results of eye-tracking research indicate that poor visibility of a sign and its bad location on the packaging fail the intended function of communicating the warning content and, thus, cannot affect the actual behaviour of consumers. It is important to ensure the effectiveness of the warnings placed on packaging; therefore, research should be conducted on the perception and acceptance. The conducted study showed that the presence of pictograms (graphic symbols) does not guarantee the focus of potential buyers' attention. The analysis of obtained results clearly indicated that efficiency of perception is the result of many elements, including the placement of the sign, its size and colours, a link between graphic and textual information, and the colour of the packaging material and the label, as proved by Gold at al. (2021).

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