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Perception of Family and Non-Family Company Logos in Eye Tracking and Face Reading Studies

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Abstract

Theoretical background: This article continues the research on the use of eye tracking and face reading tools to analyze and meaning of visual and emotional activity in the marketing field. This research focuses on understanding how different elements of the visual identity of companies, both family-owned and non-family-owned, affect consumer perception and emotion.

Purpose of the article: The purpose of the study was to identify and characterize differences in the perception of logos of family and non-family businesses. The work aimed to determine whether family brands evoke stronger emotional and visual engagement compared to non-family brands.

Research methods: The paper presents the methodology and results of the completed research on the elements of visual identity of family and non-family businesses. The study was carried out using eye tracking (eye tracking) and monitoring of respondents' facial expressions (face reading). Data on respondents' visual activity and facial expression were collected in parallel and subjected to qualitative analysis.

Main findings: The results of the study confirm that consumers show greater emotional involvement in exploring family brands. They registered a higher percentage of positive emotions and a longer time of focusing their eyes on logos of family-owned companies compared to logos of non-family-owned companies. This analysis provides valuable information for marketing strategies, indicating the importance of family identity in building positive brand associations.

Introduction

Family businesses are the oldest form of business (Lachiewicz & Matejun, 2007) and are an important foundation of the global economy. The tendency to operate in the market on a long-term basis and to run a business for several generations, as well as to combine management and family functions, make these entities characterized by many specific features, and consequently they also have a unique image and identity, with which they are clearly identified (Sułkowski & Marjański, 2009).

In order to effectively influence the viewer, this distinctiveness is often emphasized in visual identity elements, such as the family name in the company name or the coat of arms in the logotype. Potential consumers often connect the characteristics of familiality with the company's activities which can contribute to a positive perception of the company (Żukowska, 2021).

The issue of identity in economics was first addressed in the 1950s and 1960s by American business practitioners: Selame and Selame (1977), Carter (1982), Chajet and Shachtman (1998) and referred only to corporate identity. The creator of the concept of corporate identity is considered to be American entrepreneur Margulies, who used the phrase to distinguish the services of his consulting firm from those of other companies (after Łaski-Spodar, 2013; Van Riel & Balmer, 1997).

Nowadays, the term "enterprise identity" is defined as a set of values and characteristics that enable an enterprise to present itself and its achievements in a distinctive way. For the purposes of this work, a definition was adopted (Penc, 1998), which notes that it is the self-presentation of an enterprise in the marketing environment to identify itself, its products or services. The totality of the thoughts, information and images contained in the recipient's consciousness that are associated with the

brand, and therefore also the attitude towards it, make up the overall image of the company (Budzyński, 2002; Kotler & Barich, 1991).

Family business branding, is a growing area of research that examines how family businesses use their unique characteristics to create a brand identity. Research indicates that branding family businesses can offer significant benefits, but also comes with challenges that require careful management. One of the key advantages of branding family businesses is to increase trust and customer loyalty. Family businesses are perceived as more authentic and trustworthy, which can lead to stronger purchase intentions. A study by Lude and Prügl (2018) found that consumers tend to have higher levels of trust in brands that communicate their familiality, resulting in stronger purchase intentions. Branding of family businesses is also linked to positive organizational performance. Astrachan et al. (2018) indicate that family firms can improve their performance and gain competitive advantage by effectively using their family identity as a branding element.

Challenges in branding family businesses – literature analysis

One of the main challenges in branding family businesses is the lack of a unified definition and research framework to standardize and advance research in this area. Astrachan et al. (2018) emphasize the need for a multidimensional concept of family business branding to systematize and inspire future research. Another challenge is the negative associations that can result from a family business's status, such as perceptions of nepotism or lack of professionalism. Astrachan et al. (2019) note that these negative associations can deter some stakeholders, which requires appropriate communication strategies.

The development of branding strategies in family businesses often includes communicating the nature of the family business to stakeholders. Research by Martinez et al. (2019) shows that family company brand communication can positively impact company revenue, especially in companies with greater family ownership and simpler websites. Research by Zhang and Rowan (2022) indicates that family company brand communication differs depending on the target group. The impact of family harmony on family company branding is positive for internal stakeholders (family), but takes the opposite shape for external stakeholders (Zhang & Rowan, 2022).

Communicating the brand of a family business can significantly affect a company's financial performance. Martínez et al. (2019) find that communicating the family company brand is positively related to company revenue, especially in companies with simpler websites. In addition, research by Craig et al. (2008) has shown that a family-based brand identity can increase competitiveness and financial performance by developing customer orientation, leading to higher growth rates and profitability.

One of the key studies in this area is that of Ibáñez et al. (2021), which analyzed how visual stimuli on websites affect family company status recognition and consum-

er behavior. The study found that visual attention directly and positively influences recognition of a family company's identity, which, in turn, leads to higher levels of trust in the company and positive attitudes toward the brand. These results suggest that effective communication of a family firm's identity can significantly influence consumer behavior (Ibáñez et al., 2023).

Although Chae et al.'s (2012) study did not deal directly with family businesses, the results may be applicable. The researchers used eye tracking to examine the influence of personal brands in the online shopping environment, focusing on product type and personal brand attachment. The results showed that both product type and level of personal brand attachment have a significant impact on customers' visual attention and perceived trust in the product. These results suggest that a similar approach may be useful in the context of family business brands (Chae et al., 2012). A study by Bialkova et al. (2020) using eye tracking investigated the mechanisms of consumer attention and choice under both controlled laboratory conditions and real retail conditions. The results showed that a product's brand and taste were the main criteria for attracting attention and influencing consumer choice. Although this study focused on food products, its methodology can be applied to analyze how family business brands are perceived in different market contexts (Bialkova et al., 2020).

The results of this research show that eye tracking technology provides valuable insights into how consumers perceive family business brands. Visual attention is a key factor influencing brand recognition, trust in a company and purchase intentions. Effective use of visual stimuli in marketing communications can significantly improve consumer perceptions of a family brand (Michalski & Grobelny, 2016; Wade, 2010). However, despite the promising results, there is a need for further research in this area. Current research is often limited to controlled laboratory conditions or specific market contexts. Research in different sectors and real market conditions is needed to gain a more comprehensive understanding of the impact of family business branding on consumer behavior.

Repeatability and extensibility of the research are key to confirming and generalizing the results. In the context of branding family businesses, repeating surveys in different industries and geographic regions will allow verification of whether the results obtained are universal or context-specific. Additionally, the use of more advanced eye tracking technologies and integration with other research methods (e.g. surveys, interviews) can provide more information and more comprehensive data (Graham et al., 2012). Eye tracking research provides valuable information on how consumers perceive and react to family business brands. Analyzing visual attention helps understand which elements of a brand's communications attract the most attention and how they influence consumer attitudes and behavior. The results of this research can help family businesses better design their marketing strategies to more effectively communicate their identity and build trust among consumers. The need for repeated research in different contexts and integration with other research methods are key steps in the further development of this field.

Research methods

The study was conducted using eye tracking and facial expression tracking (face reading) using a GP3 eye tracker with Gazepoint Control software, a webcam and iMotions software in 2024. Emotions are an integral part of modern marketing. A review of the literature (Chrąchol, 2013; Dolińska-Weryńska, 2015; Kotarbiński, 2014; Szydlik, 2014) raises the assumption that emotions in marketing most often concern brand activities, advertising messages and selected areas of online marketing. The thesis that modern marketing, especially in the area of added value, influences consumer decisions mainly through emotional stimuli is confirmed, among other things, by Niedzielska's (2016) research. Gobe (2001), on the other hand, in defining the concept of emotional branding, writes that the biggest misunderstanding in branding strategies is the belief that branding is about market share, when in fact it is about mind share and emotions.

One of the most universal ways of expressing emotions is facial expressions. Ekman and Friesen (1978) developed the Facial Action Coding System (FACS), which organizes facial muscle movements that have been extracted from whole facial behaviors and micro-movements of the human face. The FACS model allows their categorization for more accurate determination of emotional state. Modern software and hardware solutions use this knowledge to interpret facial expressions, which are recorded by optical sensors such as a camera, and infer from them a person's emotional experience (Yarbus, 1967).

Face reading is a non-invasive method that uses computer analysis of the face to determine the occurrence of a particular emotion in the subject. A virtual grid is superimposed on the image obtained from the camera, which captures facial landmarks and then creates a virtual model of the subject's face that matches the previously mentioned landmarks. The model is a simplification, but contains all the facial features necessary for reading emotions. The information is entered as data into the system (www.imotions.com), where an algorithm interprets emotions from hundreds of thousands of photos stored in the database by analyzing statistics and normative distributions of all respondents' features from multiple geographic regions. Classification is done on a statistical and mathematical level.

The iMotions software used in the study made it possible to record the following emotions: anger, sadness, disgust, joy, surprise, fear, thoughtfulness, involvement, attention, positivity, negativity, neutrality. Ekman's theory of emotions (Ekman & Davidsown, 1999) assumes that the primary emotions are fear, anger, sadness, surprise, joy, and disgust, as they are experienced and recognized by all people. Other emotions are a mixture of basic emotions, their expression depends on cultural patterns.

This study analyzed the perception of logos of family-owned (FR) and non-family-owned (FNR) companies using eye tracking technology. The goal of the study was to understand how different age groups respond to visual representations of brands and what elements of logos attract the most attention. The analysis focused

on key metrics such as number of revisits, fixation time, areas of interest (AOIs) and scanning paths, providing a deeper understanding of the perceptual processes involved in branding family and non-family businesses. The same survey was conducted for two age groups:

1. Group A (young adults) – people under the age of 25. This group includes elementary, high school and technical school students, as well as the bulk of students. This study group includes students of the Poznań University of Technology at different levels of education.

2. Group B (adults) – describes the age range from 26 years old. These are working people, adults starting families, parents, subjects with a stable life situation. The survey included instructors, lecturers, university staff and parents.

The first group consists of 11 participants (5 men and 6 women) between the ages of 18 and 24. The second age group, on the other hand, consists of 11 participants (5 men and 6 women) between the ages of 25 and 64. The logos were displayed in the same order for each subject for 15 seconds. During this time, participants' eye movements were measured and mapped. During the study, the following were recorded: number of revisits, fixation (time of focusing the eyes on a given item), area of interest (AOI), scanning path, total and average time of focusing the eyes on a given object.

The study included versions of the logos in effect in 2024 and listed by the companies as the official marks of their brands. Logos were selected so that one industry was represented by a family-owned company (FR) and a non-family-owned company (FNR) of similar size and recognition in the Polish market. This resulted in five pairs of FR – FNR logos, which are shown in Table 1.

Table 1. Summary of logos included in the study

	Family business (FR)		Non-family business (FNR)	
Pair no.	Brand	Owner	Brand	Owner
P1	Wedel	Lotte Wedel Ltd.	Goplana	Colian Sp. z o.o.
P2	YES	YES Biżuteria S.A.	Swarovski	Swarovski International Holding AG
P3	J.A. Baczewski	Altvater Gessler – J.A. Baczewski GmbH	Wyborowa	Wyborowa S.A.
P4	Ford	Ford Motor Company	Kia	Kia Corporation
P5	Heineken	Heineken Group	PERŁA	PERŁA – Browary Lubelskie S.A.

Source: Authors' own study.

Results

The logo of Lotte Wedel Sp. z o.o. refers to the handwritten signature that Emil Wedel, the company's owner, put on each bar of chocolate to protect his products from fakes appearing on the market. Over time, his signature became a trademark of the brand and still functions as a logotype today.

Figure 1. AOI for the Lotte Wedel company logo

Source. Authors' own study.

The logo consists of two elements, the textual composition is complemented by a tagline that includes information about the company's founding date. In the eye tracking study of the Wedel logo, four areas of interest (AOI) were determined, as shown in Figure 1. AOI 1 – the date of the opening of the first confectionery: a reference to the company's values: tradition and history; AOI 3 – the dot: a punctuation mark emphasizing that we are dealing with the initial of a name; AOI 2 and AOI 4 – an ornamental, elongated swirl extending from the letter "L" evoking an association with handwriting.

Table 2. Results of the eye tracking study of the Lotte Wedel logotype – group A

	AOI 1	AOI 2	AOI 3	AOI 4
TTFF	0.9	9.9	13.9	14.1
Time spent	2.6	0.5	0.2	0.0
Ratio	11/11	7/11	5/11	3/11

Source: Authors' own study.

Table 3. Results of the eye tracking study of the Lotte Wedel logotype – group B

	AOI 1	AOI 2	AOI 3	AOI 4
TTFF	3.9	7.0	9.4	7.9
Time spent	1.0	0.3	0.0	0.1
Ratio	9/11	6/11	2/11	4/11

Source: Authors' own study.

The largest number of respondents, 20 out of 22, focused their gaze at AOI 1. The date located in the upper left corner is also the area with the longest fixation times, regardless of the age of the respondents. Young respondents (group A), however, were quicker to direct their attention in this direction than respondents in the other age group (group B). The average time to first fixation (TTFF) in AOI 1 was 0.9 sec. for group A and 3.9 sec. for group B. Few subjects paid attention to the extension of the line starting from the letter "L" smoothly transitioning into the underlining of the name. (AOI 4). Respondents did, however, pay attention to the ornate upper

part of the name initial and the dot appearing after it (AOI 3), however briefly, only beginning the reading path of the text.

Figure 2. Eye tracking results for the Wedel logotype in the form of a heat map for research groups A and B

Source: Authors' own study (image generated with iMotions software).

The results, presented in the form of a heat map (Figure 2), where the areas with the highest fixation are marked in red, indicate that both age groups of subjects explored the logotype in a similar way. A slight deviation is the shift in fixation of older adults to the lower part of the closed mesh of the letter "d". Differences in the reception of different age groups are revealed when analyzing the face reading survey transcript. Significantly more emotions were aroused by the Wedel logotype in respondents over 25 years of age (group B), as shown in Table 4. No negative emotions were registered in any respondent. In the first age group, neutral emotions were identified for 91.9% of the survey time, while positive emotions were identified for 8.1%. In the second age group, the distribution was similar, with neutral emotions accounting for 90.5% and positive emotions for 9.5%.

Table 4. Average ratio of the time of feeling each emotion to the time of the survey (in %) for the Wedel logotype

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	3.26	0.00	0.00	3.26
B	0.00	0.00	0.00	4.78	7.00	0.00	11.79

Source: Authors' own study.

Figure 3. AOI for the Goplana company logo

Source: Authors' own study.

The typography of Goplana's logotype is based, like Wedel's, on a font suggesting a decorative, handwritten character. However, sharp letter endings were used here. Due to the peculiarities of the logotype, three areas of interest were determined, as shown in Figure 3: AOI 1 – the date of the company's founding; AOI 2 – the extension of the letter "G" transforming into a handwritten underline of the name; AOI 3 – the sharp tips of the letters.

The vast majority of subjects (21 out of 22) focused their attention on the logotype component located in the lower right corner of the presented stimulus, the year 1912 (AOI 1). This occurred as early as the first and second seconds of observation (Table 5, Table 6), with the fixation time on this component of group B subjects being half as long (Figure 4). The swirl (AOI 2), an extension of the letter "G", was pointed out by 3 respondents in group A and 6 respondents in group B, but the average fixation times were very short: 0.1 sec., and 0.2 sec. Twenty respondents drew attention to the sharp vertices of the letters when scanning the logotype with their eyes (AOI 3).

Table 5. Results of the eye tracking study of the Goplana logotype – group A

	AOI 1	AOI 2	AOI 3
TTFF	1.7	12.8	2.2
Time spent	1.9	0.1	2.4
Ratio	11/11	3/11	11/11

Source: Authors' own study.

Table 6. Results of the eye tracking study of the Goplana logotype – group B

	AOI 1	AOI 2	AOI 3
TTFF	2.6	6.0	3.8
Time spent	1.0	0.2	1.5
Ratio	10/11	6/11	9/11

Source: Authors' own study.

Figure 4. Eye tracking results for the Goplana logotype in the form of a heat map for research groups A and B

Source: Authors' own study (image generated with iMotions software).

The distribution of attention during visual exploration in both study groups was similar, except for longer fixation time in AOI 1 of group A (Figure 4). The face

reading survey showed greater differences between age groups. A compilation of the results in Table 7 shows that the Goplana logo evoked emotions composed of anger, sadness and joy in older respondents. In younger respondents, it was recorded that 99.9% mainly felt neutral emotions, only 0.1% were positive emotions. In the older group, 99.1% felt neutral emotions, 0.7% – negative, 0.2% – positive.

Table 7. Average ratio of time of feeling each emotion to time of testing (in %) for Goplana logotype

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.75	0.87	0.00	0.06	0.00	0.00	1.68

Source: Authors' own study.

Analyzing the record of the face reading survey for the overall breakdown of emotional reception (neutral, positive, negative), it was noted that it was similar for both research groups within each of the P1 pair's logos. Positivity for the reception of Wedel's logos was 8.1% and 9.5%, negativity did not occur. Goplana's results within the age groups are also similar. Differences appear, however, when the logos are juxtaposed in the P1 pair (Table 8), in which case it is noted that a higher percentage of positive emotions were recorded for the family company's logos than for those of the non-family company. Specifically, participants in the study showed greater emotional engagement and longer eye focus time on the family company logo. This suggests that the visual elements and associations associated with family businesses may elicit stronger positive reactions compared to non-family businesses. Analysis of these results can provide valuable information for marketing strategies and logo design aimed at increasing brand appeal and recognition.

Table 8. Summary of total times (%) of emotion experienced by both research groups in the P1 logotype pair

	Wedel (FR)		Goplana (FNR)	
emotions	Group A	Group B	Group A	Group B
positive	8.1	9.5	0.1	0.2
negative	0.0	0.0	0.0	0.7
neutral	91.9	90.5	99.9	99.1

Source: Authors' own study.

A pair of P2 logos

Figure 5. AOI for the Swarovski logo

Source: Authors' own study.

Swarovski's logo consists of a graphic and text part. It distinguishes three AOIs (Figure 5): AOI 1 – the name of the company, derived from the name of the founder; AOI 2 and AOI 3 – elements of the signet, a graphic representation of a swan.

Both research groups spent the longest time observing the typographic part of the logotype, with younger respondents focusing their eyes mainly on the tops of the letters for 4.1 sec., exploring the letters "W", "R", "V" for the longest time. Older respondents took half as long to read the text – 2 sec., with no significant indication of fixation on any letter. All respondents paid attention to the signet, noting the octagonal shape symbolizing the crystal and the swan graphic enclosed within it. The slender neck of the swan did not escape the attention of any of the subjects; group A looked at this element for 2.6 sec., while group B looked at it for one second less. The results are presented in Table 9, Table 10 and Figure 6.

Table 9. Results of the eye tracking study of Swarovski logos – group A

	AOI 1	AOI 2	AOI 3
TTFF	1.7	0.8	4
Time spent	4.1	2.6	0.6
Ratio	11/11	11/11	11/11

Source: Authors' own study.

Table 10. Results of the eye tracking study of Swarovski logos – group B

	AOI 1	AOI 2	AOI 3
TTFF	1.1	1.8	4.3
Time spent	2.0	1.6	0.2
Ratio	11/11	11/11	7/11

Source: Authors' own study.

Figure 6. Eye tracking results for Swarovski logos in the form of a heat map for study group A and B

Source: Authors' own study (image generated using iMotions software).

For the Swarovski logo, no emotions were recorded in the first age group. In the group of people over 25 years of age, emotions consisting of disgust and joy appeared for 3.51% of the testing time for this stimulus (Table 11).

Table 11. Average ratio of the time of feeling each emotion to the time of testing (in %) for the Swarovski logo

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.00	0.00	2.99	0.52	0.00	0.00	3.51

Source: Authors' own study.

Figure 7. AOI for the YES logotype

Source: Authors' own study.

YES Biżuteria S.A.'s logotype is minimalist, consisting only of a short typographic section, three black letters. The frugality of the form led to the designation of two areas of interest here (Figure 7): AOI 1 – a kink in the middle of the letter "Y"; AOI 2 – a slender letter "S".

The scanning path of all subjects started from the middle of the letter "Y", then through the middle of the letter "E" towards the top of the letter "S". In the first group of respondents, the inflection of the letter attracted the gaze of 10 people for an average of 1.8 sec. (Table 12). The rounding of the letter "S" was noticed by all respondents in this age group spending 2.2 sec. here. In group B, fewer subjects focused their gaze in areas of interest, only 9 subjects in AOI 1 and 8 subjects a AOI 2 (Table 13). The respondents, as in group A, focused on the upper part of the letters while ignoring their bases.

Table 12. Results of the eye tracking study of the YES logotype – group A

	AOI 1	AOI 2
TTFF	2.5	2.3
Time spent	1.8	2.2
Ratio	10/11	11/11

Source: Authors' own study.

Table 13. Results of the eye tracking study of the YES logotype – group B

	AOI 1	AOI 2
TTFF	2.4	3.7
Time spent	0.7	1.3
Ratio	9/11	8/11

Source: Authors' own study.

The heat map results for both groups are similar. The increased attention in group B on the central part of the logotype may be due to the low complexity of the stimulus and the anticipation of displaying the next one.

Figure 8. Eye tracking results for the YES logo in the form of a heat map for research groups A and B

Source: Authors' own study (image generated with iMotions software).

The YES logotype elicited a look of surprise on the face of the young adults (Table 14), while it did not elicit any emotion in the second research group.

Table 14. Average ratio of the time of feeling each emotion to the time of the survey (in %) for the YES logo

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	0.00	0.70	0.00	0.70
B	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' own study.

The perception of the YES logotype was dominated by neutrality (Table 15) for both age groups. The perception of the Swarovski logotype shows a slight difference between the groups of respondents, with the older ones showing negative emotions accounting for 4.2%. In the P2 pair, greater neutrality was evoked by the YES logotype.

Table 15. Summary of total times (%) of emotion felt by both research groups in the P2 logotype pairing

emotions	YES (FR)		Swarovski (FNR)	
	Group A	Group B	Group A	Group B
positive	2.1	1.5	2.6	0.0
negative	0.0	4.2	0.0	0.0
neutral	97.9	94.3	97.4	100

Source: Authors' own study.

A pair of P3 logos

Figure 9. AOI for the logotype of J.A. Baczewski

Source: Authors' own study.

For the logotype of J.A. Baczewski (Figure 9), three AOIs were designated: AOI 1 – letter "A"; AOI 2 – graphic: extension of letter "A" and symmetrically arranged glasses; AOI 3 – letter "B". The analysis shows that all respondents focused the longest on the mirror image of the upper bellies of the letters "A" and "B". Group A respondents perceived AOI 1 very quickly, as early as 0.4 sec. after the start of the logotype presentation, and spent an average of 6.7 sec. there, while group B respondents viewed this area for 2.7 sec. (Table 16, Table 17). The second element of high interest turned out to be a graphic depicting symmetrically arranged glasses. Fixation times were 1.8 sec. for the young adult group and 2.0 sec. for the older group. The scanning paths in AOI 2 show that the long fixations are due to the analysis of the symmetry of the cups and the transfer of gaze between one cup and the other.

Table 16. Results of the eye tracking study of the J.A. Baczewski logotype – group A

	AOI 1	AOI 2	AOI 3
TTFF	0.4	3.2	114
Time spent	6.7	1.8	0.3
Ratio	11/11	11/11	7/11

Source: Authors' own study.

Table 17. Results of the eye tracking study of the J.A. Baczewski logotype – group B

	AOI 1	AOI 2	AOI 3
TTFF	0.6	2.1	2.0
Time spent	2.7	2.0	0.7
Ratio	11/11	11/11	10/11

Source: Authors' own study.

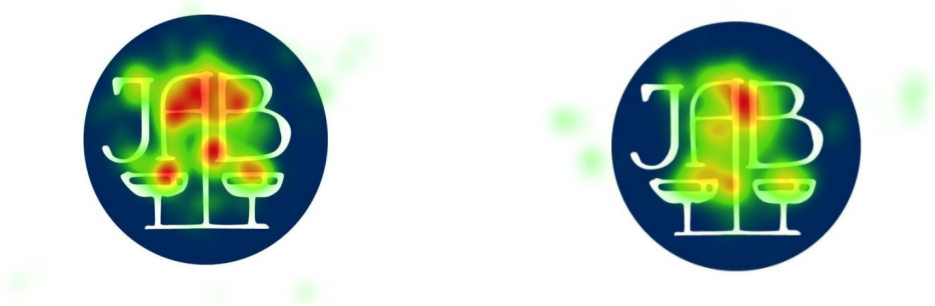

Figure 10. Eye tracking results for the logotype of the company J.A. Baczewski in the form of a heat map for research groups A and B

Source: Authors' own study (image generated using iMotions software).

In both age groups, the face reading study revealed positive emotions. Younger respondents revealed joy for 1.77% of the stimulus exploration time, while older respondents revealed joy for a shorter time, 0.87% (Table 18).

Table 18. Average ratio of the time of experiencing each emotion to the time of the survey (in %) for the J.A. Baczewski logotype

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	1.77	0.00	0.00	1.77
B	0.00	0.00	0.00	0.87	0.00	0.00	0.87

Source: Authors' own study.

Figure 11. AOI for the Wyborowa logotype

Source: Authors' own study.

The Wyborowa brand logotype is made up of letters with a simple typeface and the ® symbol indicating that this trademark is registered. AOI is denoted in Figure 11: AOI 1 – the letter "O" forming the central point of this logotype; AOI 2 – the ® symbol.

As in previous typographic logos, the respondents rarely looked at the bases of the Wyborowa lettering, focusing their gaze on the tops of the letters. The eye tracking results for both groups are similar. The only deviation is the longer focus of group B's gaze on the lower left part of the second letter "O" (Figure 11). The ® "registered" sign in group A was noticed by ten out of eleven respondents focusing their gaze on it for an average of 0.6 sec. (Table 19). In group B, only five people paid attention to the item, and only 8.3 sec. after exposure. Interest in AOI 2 was significantly lower than in group A, with an average observation time of 0.2 sec.

Table 19. Results of the eye tracking study of the Wyborowa logotype – group A

	AOI 1	AOI 2
TTFF	1.6	4.8
Time spent	1.2	0.6
Ratio	11/11	10/11

Source: Authors' own study.

Table 20. Results of the eye tracking study of the Wyborowa logotype – group B

	AOI 1	AOI 2
TTFF	0.7	8.3
Time spent	1.0	0.2
Ratio	11/11	5/11

Source: Authors' own study.

Figure 12. Eye tracking results for the Wyborowa logotype in the form of a heat map for research groups A and B

Source: Authors' own study (image generated using iMotions software).

Slight differences in the reception of the Wyborowa logotype between age groups A and B were noted at the level of emotion recording. Joy was recorded in both groups, but in young adults it accounted for 2.04% of the test time, and in older adults for 1.23% (Table 21).

Table 21. Average ratio of the time of feeling each emotion to the time of the survey (in %) for the Wyborowa S.A. logotype

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.06	1.97	0.00	0.00	2.04
B	0.00	0.00	0.00	1.23	0.00	0.00	1.23

Source: Authors' own study.

Negativity for the logotype J.A. Baczewski did not occur in any of the age groups, while for the Wyborowa logotype it was recorded at 1.4% in the young adult group (Table 22). The positive perception of J.A. Baczewski was more than twice as high among older adults as among younger adults, at 9.5%.

Table 22. Summary of total times (%) of emotion experienced by both research groups in the P3 logotype pair

	J.A. Baczewski		Wyborowa	
emotions	Group A	Group B	Group A	Group B
positive	4.2	9.5	2.3	3.2
negative	0.0	0.0	1.4	0.0
neutral	95.8	90.5	96.3	96.8

Source: Authors' own study.

A pair of P4 logos

Figure 13. AOI for the Ford logotype

Source: Authors' own study.

The name of the owner of Ford Motor Company enclosed in an oval shape is another logo analyzed. Three areas of interest were delineated here: AOI 1 and AOI 2 – decorative swirls, trims of the letter "F" bringing to mind handwriting; AOI 3 – a line emphasizing the oval shape of the logotype (Figure 13). The shape of the logotype did not arouse the interest of the subjects, in group A only at the very end of the study did one person pay attention to it, in group B four people (Table 23, Table 24). The longest fixation times were recorded in AOI 2, averaging 2.3 sec. for the first study group and 1.2 sec. for the second group. The most frequent revisits were recorded at the finish of the letter "F" (AOI 2) from which reading was started focusing on the vertices of the letters.

Table 23. Results of the eye tracking study of the Ford Motor Company logotype – group A

	AOI 1	AOI 2	AOI 3
TTFF	6.6	1.2	14.9
Time spent	0.6	2.3	0.1
Ratio	9/11	9/11	1/11

Source: Authors' own study.

Table 24. Results of the eye tracking study of the Ford Motor Company logotype – group B

	AOI 1	AOI 2	AOI 3
TTFF	7.9	5.6	7.5
Time spent	0.1	1.2	0.1
Ratio	4/11	7/11	4/11

Source: Authors' own study.

Figure 14. Eye tracking results for the Ford logotype in the form of a heat map for study groups A and B

Source: Authors' own study (image generated using iMotions software).

Heat maps of the eye tracking study for both groups are similar (Figure 14). Differences were noted in the recording of facial expressions (FR). The dominant emotion was joy, which was recorded in the first group for 4.2% of the time the Ford logo was displayed, and in the second group during 3.67% of the time. The logotype elicited a wider range of emotions from older respondents, and anger, sadness, disgust and surprise were also recorded, the results are shown in Table 25.

Table 25. Average ratio of the time of feeling each emotion to the time of testing (in %) for the Ford logo

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	4.20	0.00	0.00	4.20
B	2.18	1.93	0.06	3.67	0.06	0.00	7.90

Source: Authors' own study.

Figure 15. AOI for the Kia logotype

Source: Authors' own study.

In the Kia logo, we are dealing with a composition based on continuity of lines and repetition of pattern. This allowed to determine two areas of interest: AOI 1 – the left part of the logotype, the letter "K"; AOI 2: the right part, the continuous line of the letters "I" and "A" (Figure 15). Both groups of respondents were quicker to direct their gaze to the AOI 1 area than AOI 2 (Table 26, Table 27). This natural order is due to the direction of reading, which in Polish runs from left to right. Respon-

dents were more curious about the AOI 1 area, where they spent an average of 4.9 sec. (group A) and 3.1 sec. (group B), which for both age groups is twice as much time as that spent in AOI 2. The scanning paths of individual respondents, the order of exploration and the highest number of revisits appearing at the junction of "K" and "I" (Figure 16) prove that the respondents compared items among themselves, looking for similarities between them (e.g. between the top combination of letters "K" and "I" and the bottom combination of letters "I" and "A").

Table 26. Results of the eye tracking study of Kia Corporation logos – group A

	AOI 1	AOI 2
TTFF	0.3	1.6
Time spent	4.9	3.5
Ratio	11/11	11/11

Source: Authors' own study.

Table 27. Results of the eye tracking study of Kia Corporation logos – group B

	AOI 1	AOI 2
TTFF	0.3	2.1
Time spent	3.1	1.7
Ratio	11/11	10/11

Source: Authors' own study.

The heat maps of the two groups of subjects are similar. The increased interest in group B for the lower point in AOI area 1 may be due to the way the elderly made comparisons of the repetition of elements, the letter "K" versus the combined letters "I" and "A", identifying the lower leg of the letter "K" as the discordant element and distinguishing the two areas (Figure 16).

Figure 16. Eye tracking results for Kia logos in the form of a heat map for research groups A and B

Source: Authors' own study (image generated using iMotions software).

Table 28. Average ratio of the time of feeling each emotion to the time of testing (in %) for Kia logos

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	1.00	0.00	0.00	1.00
B	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' own study.

In the face reading survey, feelings of joy were noted in younger respondents, while none of the emotions classified in Table 28 appeared in older respondents. The juxtaposition of positive, negative or no emotions (Table 29) also allows us to note that the positive perception is much higher in group A than in group B. No negative emotions were recorded in the younger ones, while older adults accounted for 3.9%.

In the case of the Ford logo, too, one can see a difference in perception depending on age group membership. Positivity is much higher for the first group, although negativity also appears there, which is not present in the second group. A comparison of the logos of the P4 pair brings the reflection that the logo of the Ford family company evokes far more positive emotions than that of Kia.

Table 29. Summary of total times (%) of emotion felt by both research groups in the P4 logotype pair

	Ford		Kia	
emotions	Group A	Group B	Group A	Group B
positive	11.1	5.0	2.2	0.7
negative	0.4	0.0	3.9	0.0
neutral	88.5	95.0	93.9	99.3

Source: Authors' own study.

A pair of P5 logos

Figure 17. AOI for the Heineken logotype

Source: Authors' own study.

The Heineken Group logo consists of a graphic mark, text notation and a "registered" mark. Due to the length of the typographic part, four areas of interest were distinguished: AOI 1 – graphic, red star; AOI 2, AOI 3, AOI 4 – the letters "E" repeated in the lettering; AOI 4 – the ® sign (Figure 17). As in previous typographic logos, here too the tendency to read by scanning the vertices of the letters is noticeable (Figure 18). The *sigil*, or red star, was noticed relatively early, the time to first fixation in AOI 1 was 2.6 sec. in group A and 3.5 sec. in group B. The average attentional engagement in all subjects was 1.4 sec. in this area, meaning that it is the area with the longest engagement time for both age groups. The typeface used for the repeated letter "E" suggests a gentle, smiling character. This caught the attention of younger respondents, for whom the total time spent analyzing all the "E" letters was 3.2 sec. It took older adults 1.1 sec.

In each group of respondents, more than half paid attention to the "registered" sign, with 8 people in group A and 7 people in group B. Adult respondents, however, attached less importance to the fact that it is a registered mark, spending more than twice as much time in AOI 5 as younger respondents. In addition to the results in the tables below (Table 30, Table 31), this is also illustrated by the heat map (Figure 18), where this point in AOI 5 for group B is more diffuse, while for group A it is outlined in red.

Table 30. Heineken logo eye tracking results – group A

	AOI 1	AOI 2	AOI 3	AOI 4	AOI 5
TTFF	2.6	6.9	3.8	8.8	7.9
Time spent	1.4	0.7	1.4	1.0	0.7
Ratio	11/11	10/11	11/11	8/11	8/11

Source: Authors' own study.

Table 31. Heineken logo eye tracking results – group B

	AOI 1	AOI 2	AOI 3	AOI 4	AOI 5
TTFF	3.5	2.9	3.2	6.7	6.4
Time spent	1.4	0.6	0.4	0.1	0.3
Ratio	10/11	10/11	9/11	6/11	7/11

Source: Authors' own study.

Figure 18. Eye tracking results for the Heineken logo in the form of a heat map for research groups A and B

Source: Authors' own study (image generated with iMotions software).

Table 32. Average ratio of the time of feeling each emotion to the time of the survey (in %) for the Heineken logo

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	0.64	0.00	0.00	0.64
B	0.00	0.00	0.00	5.89	0.00	0.00	5.89

Source: Authors' own study.

The only emotion recorded for both age groups during the presentation of the Heineken logo was joy, which was definitely felt longer (5.89% of the survey time) by adult respondents (Table 32).

Figure 19. AOI for the PERŁA logotype

Source: Authors' own study.

The logo of PERŁA – Browary Lubelskie S.A. consists of a text element and several graphic elements, such as a red shape suggesting a flying flag and golden stripes. It distinguishes four areas of interest: AOI 1 – the first part of the inscription, the letters "PER"; AOI 2 – the second part of the inscription, the letter "Ł"; AOI 3 – the graphic element, the upper gold strip. Both groups noted interest in the shape of the logo itself, as shown by the green dots on the heat maps at the top of the red flag; additionally, group B respondents also explored the lower outlines of the flag (Figure 19). Almost all respondents, except for one person in Group B, paid attention to the upper gold decorative element (AOI 3). The largest amount of time was spent by all respondents in both groups on the first typographical section (AOI 1), which took 5.0 sec. (group A) and 3.5 sec. (group B), with the older subjects returning with greater frequency to the central part of the inscription, the light inside the letter "P", while the attention of the younger ones was evenly distributed between the read "E" and "R". The data are provided in Table 33 and Table 34. Fixations in AOI 2, despite similar times for both groups, were located in different locations. Young adults focused on the lower part of the letter "Ł" and its acute angle, while older adults focused on its upper part.

Table 33. Results of the eye tracking study of the PERŁA – Browary Lubelskie S.A. logo – group A

	AOI 1	AOI 2	AOI 3
TTFF	0.8	1.1	1.6
Time spent	5.0	1.4	2.5
Ratio	11/11	11/11	11/11

Source: Authors' own study.

Table 34. Results of the eye tracking study of the PERŁA – Browary Lubelskie S.A. logo – group B

	AOI 1	AOI 2	AOI 3
TTFF	1.2	4.0	2.7
Time spent	3.5	1.2	0.9
Ratio	11/11	8/11	10/11

Source: Authors' own study.

Figure 20. Eye tracking results for the PERŁA logotype in the form of a heat map for research groups A and B

Source: Authors' own study (image generated using iMotions software).

In the emotional reception of the PERŁA logotype, as with the Heineken logotype, differences were noted between age groups. Young adults did not show any of the emotions classified in Table 35 during the study of this stimulus, while older adults showed emotions consisting of disgust and joy for 6.37% of the study time.

Table 35. Average ratio of the time of feeling each emotion to the time of the survey (in %) for the PERŁA logo

Research group	Anger	Sadness	Disgust	Joy	Shock	Fear	Total
A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.00	0.00	0.42	2.63	3.33	0.00	6.37

Source: Authors' own study.

The results for the two age groups for the Heineken logo and the PERŁA logo differ (Table 36). For Heineken, positivity in group B is at 10.4%, while only 1.6% for the younger group. For the PERŁA logo, the older group also reported greater positive emotions than the younger group. The major differences between the logos of the P5 pair are revealed in the area of negative feelings. For the family-owned company, there were none in any group, while the perception of PERŁA was negative at 0.1% for younger respondents and 0.6% for older respondents.

Table 36. Summary of total times (%) of emotion experienced by both research groups in the P5 logo pairing

emotions	Heineken		PERŁA	
	Group A	Group B	Group A	Group B
positive	1.6	10.4	1.4	5.1
negative	0.0	0.0	0.1	0.6
neutral	98.4	89.6	98.5	94.2

Source: Authors' own study.

Conclusions

The research conducted provided information on consumer perception of logos. Among other things, they showed that the perception of logos of family and non-family companies differed depending on the age of the respondents. Younger adults (group A) showed faster and more intense emotional reactions to logos, especially of non-family companies. Older adults (group B) reacted more calmly and neutrally to most stimuli, with the exception of logos of family-owned companies such as J.A. Baczewski, which evoked positive emotions in them, albeit of shorter duration.

The eye tracking analysis revealed that focus on key elements of the logos, such as the main letters or symbols, was dominant in both groups. Differences in time to first fixation (TTFF) suggest that older adults take longer to notice these elements compared to younger adults. These findings may be useful in designing logos to more effectively capture attention and elicit desired emotional responses across age groups. Family business logos evoke more positive emotions in both age groups, suggesting that a family brand may be perceived as more trustworthy and evoke positive associations.

The eye tracking study found that family business (FF) logos (attracted more attention from participants, especially those that contained symbols or additional graphic elements. Respondents spent more time examining FF logos, suggesting that they were more interesting or more complex in their structure. Symbolic elements in FF logos were often the first elements noticed, which may indicate their effectiveness in attracting attention. In contrast, logos of non-family firms (NFF) were analyzed for a shorter period of time and attracted less attention compared to logos of family firms (FF). The lack of additional graphic elements in NFF logos made them less interesting to study participants. In NFF's typographic logos, attention was more distracted, and the lack of clear points of visual focus may have reduced their effectiveness.

The face reading study showed that FF logos evoked stronger emotions. They were most often identified as: joy, engagement and positivity. Participants' facial expressions when viewing FF logos suggested greater liking and attachment to these logos, which may be due to the perception of FF as more friendly and trusted. Emotions such as neutrality and negativity were less frequently observed for FF logos. In the case of NFF company logos, they evoked less intense emotional reactions, and neutral and negative emotions such as sadness or disgust were more frequent.

Survey participants showed less engagement and positive emotions toward NFF company logos, which may indicate that they are less attractive and effective in building positive associations. Facial expressions suggested more distance and less affection for logos of non-family companies.

The results obtained suggest that family-owned companies can enjoy an emotional advantage and greater consumer attention through proper logo design. Non-family businesses, on the other hand, should focus on improving their logos so they can

compete more effectively for consumers' attention and affection. In future studies, it would be worthwhile to examine a larger number of logos, expand the research sample to get more representative results.

Despite the use of advanced technology, such as iMotions software, the survey results have some limitations. The number of subjects was relatively small (22 respondents), which may not reflect the representativeness of the larger population. In addition, the way the experiment was conducted, including the placement of logos in a central position on a blank background and the long exposure time of the stimulus, does not reflect the actual conditions under which consumers typically view logos in everyday situations. These factors may affect the generalizability of the results, suggesting that the study was more laboratory than realistic. Presenting logos under such controlled conditions may lead to results that do not necessarily translate into actual consumer behavior. The lack of numerical analysis for eye tracking data and the limited number of respondents may introduce some distortion in the interpretation of the results. In addition, the authors of the study are aware of the lack of consideration of a holistic approach, including additional information on physiological/behavioral responses that surveys could provide to understand the context of responses.

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