








## Sustainable consumption among children and adolescents

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### Abstract

Young consumers (children and adolescents) play an increasingly important role in the functioning of the modern consumer market. Accordingly, it is becoming more important to promote sustainable, ecological consumption patterns among this group. The authors of the article analysed the results of a survey conducted on a group of 1326 children aged 9 to 15. The purpose was to diagnose the awareness and functioning patterns of consumption among the studied group of young consumers from the Polish market and to formulate a set of recommendations for the process of their ecological, economic and social education aimed at building sustainable consumption patterns. During the research process, an attempt was made to diagnose the ability to identify eleven selected, popular, pro-ecological graphic symbols placed on consumer products, aimed at assessing the skills of young consumers to identify products with better environmental parameters. The collected empirical data was analysed with the R-project program using the following methods: descriptive statistics, nonparametric Kruskal-Wallis test and Pearson Chi-square test of independence. As a result of the use of the comparative analysis method, the results of research in individual age groups of young consumers were compared and interpreted. After the research, the authors concluded that the education system lacks actions to consolidate the acquired knowledge in the field of ecolabelling, which results in large disproportions in the recognition of eco-labels both in individual age groups and in relation to selected symbols. It is disturbing that only 12.2% of the interviewed learners indicated the eco-label as a decisive factor in purchasing a food product. The authors of the article believe that among the group of young consumers, actions should be taken to raise awareness of sustainable consumption, and this requires consistent and differentiated steps at all levels of their education.

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## 1. Introduction

Young consumers play an important role in the operation of the modern consumer market. Although their market participation, due to their age, encounters a certain formal and legal restriction that determines the possibility of performing legal actions as a party to the sale and purchase transaction, in practice they constitute an important consumer group and a target for many companies that manufacture products specifically for this group of consumers. An important aspect is also the participation and influence of children on the process of making consumer decisions by their parents and other adult family members. Therefore, creating and promoting sustainable consumption patterns among this group of market participants is becoming an extremely important issue.

An attempt to define the concept of sustainable consumption based on the observation of scientific discourse allows defining it as a market activity of consumers contributing to the generation of positive economic, social and environmental effects (a triad of sustainable effects) through conscious and responsible purchasing and consumption of goods and services. It is one of the instruments for striving to implement the postulates of the concept of sustainable development in the practice of market operation. The manifestations of sustainable consumption may include selection and socially responsible use of products: saving environmental resources, produced with respect for human rights, ensuring the safety of users and the environment, contributing to the progress of civilization and implementing the principle of intergenerational solidarity.

The 2030 Agenda adopted in 2015 by all UN members established 17 sustainable development goals by 2030 (United

Nations, 2015). In the thematic context of this study, the key ones seem to be: “Objective 4 Quality of education” and “Objective 12 Sustainable consumption and production” directly related to, among other things, the issues of consumer behaviour on the market and the pro-ecological awareness that determines them, stimulating a sustainable lifestyle, built in the process of socialization using the education system. One of the conditions for the system to achieve the appropriate quality and efficiency, and thus the implementation of “Objective 4” of the Agenda, is to ensure that “by 2030 all learners acquire the knowledge and skills needed to promote sustainable development, including education for sustainable development and a sustainable lifestyle” (United Nations, 2015). At the same time, Goal 12.8 points to the need to “provide people around the world with access to appropriate information and awareness about sustainable development and a lifestyle in harmony with nature” (United Nations, 2015).

Achieving these ambitious goals will require, among the others, changing consumer behaviour on the market and reorienting them towards sustainable consumption patterns. At the same time, they will constitute a significant challenge for the education system at all levels, and in particular at the basic level, where in the process of environmental education providing knowledge, competences and skills, attitudes of responsibility for the environment are shaped, which pay off in the adult life of an environmentally conscious person, e.g. with appropriate consumer behaviour. As the United Nations Environment Programme (UNEP) notes, “Without the existence of adequate basic knowledge and the core values of sustainable development among key actors, information on environmental performance is unlikely to result in significant changes in behaviour” (UNEP, 2015).

Therefore, in striving to promote consumption patterns consistent with the paradigm of sustainable development, young consumers play an extremely important role. The effectiveness of the process of shaping sustainable consumption patterns based on effective ecological and economic education of this group of market participants depends on the effect of educating market-aware consumers, making sustainable market decisions in the future. As K. Kevany 2019 notes, “To consume consciously is a process of deliberation to purposefully and thoughtfully consume what is beneficial and necessary and not consume unconsciously things that are unhelpful or harmful. Conscious consumption also is a philosophy and growing social movement that encourages citizens to become aware of the impact of their consumption practices on their own health and well-being and to consider the social, economic, environmental, and communal implications” (Kevany, 2019). At the same time, according to Laura Therese Heintl, Anna Baatz, Markus Beckmann and Peter Wehnert 2021 “Fostering sustainable consumer behaviour by enabling consumers to make an informed choice for sustainable products is vital in changing human consumption for the better” (Heintl et al., 2021)

This article presents selected, synthetic results of the analysis of the collected empirical material along with a set of recommendations for the development of sustainable consumption patterns among children and adolescents. For the

purposes of the analysis, the understanding of the concept of a young consumer was assumed as a person participating in the decision-making process, purchasing products and/or services in order to meet their needs and using them or exerting a significant influence on purchasing decisions made in the family. On the other hand, purchasing behaviour as a whole of activities and actions related to making decisions regarding the purchase of products/and services, aimed at satisfying the own needs of a young person.

## 2. Material and Methods/Literature review

The research described in this article focused on diagnosing awareness and functioning patterns of consumption among the studied group of young consumers from the Polish market, and on making a set of recommendations for the process of their ecological, economic and social education aimed at building sustainable consumption patterns. The survey was conducted in 2020 among 1326 children from primary schools in Poland, in the age groups from 9 to 15 years old. The survey questionnaire consisted of two parts, i.e. the substantive part and the demographics. The first part of the questionnaire contained a set of questions concerning, among other things, the ability to identify products with better environmental parameters by children, behaviours related to eating, shopping and implementing pro-ecological solutions in their households. The questions included in the questionnaire were mostly closed, and the answers were presented as an alternative, a closed set of many possible answers, a semi-open set, allowing the respondent to add other options. One question was open-ended, allowing the respondent to give a short answer.

In the course of the research process an attempt was made to diagnose the ability to identify 11 selected, popular, pro-ecological graphic symbols placed on consumer products on the Polish market, aimed at assessing the ability of young consumers to identify products with better environmental parameters.

The analysis of this aspect was supported by the fact that the issue of ecolabelling of consumer products is increasingly emphasized in the public and scientific discourse in the areas of management and quality sciences, economics and finance, economic policy, production engineering and natural sciences. According to L. Kaźmierczak-Piwko, A. Dybikowska, E. Celińska, J. Ratajczak, “Eco-labelling (also known as eco-label, environmental labelling), considered to be one of the environmental management processes in an enterprise, consists in granting eco-friendly products a special quality mark that proves the fact that it is an ‘environmentally friendly’ product” (Kaźmierczak-Piwko et al., 2017).

This problem was also analysed by L. Ibanez and observed that “An ecolabel is a market-based policy instrument that can be either voluntarily adopted or mandated by law. Ecolabels are applied to services and products in order to inform consumers of their environmental-friendliness and to avoid market failures” (Ibanez, 2016). The very meaning of ecolabelling results from the realization of the function fulfilled by ecological symbols. The collected empirical data was analysed using the R-project program with the use of the following methods:

descriptive statistics, nonparametric Kruskal-Wallis test, equivalent to ANOVA test and Pearson Chi-square test of independence, the significance level was  $\alpha=0.05$ . As a result of the use of the comparative analysis method, the results of research in individual age groups of young consumers were compared and interpreted. The literature on the subject lists the basic functions of ecolabelling:

- “ecological” – thanks to the use of “green” products, human minimizes the negative impact on the environment;
- information and education – on the basis of reliable and clear information, the consumer is able to make an informed decision related to the choice of a pro-ecological product;
- marketing – contemporary trends related to the pro-ecological lifestyle mean that the greening of the offered products allows enterprises to build a competitive advantage;
- protective – both the consumer, producer and society are protected: the consumer thanks to the information placed on the product, the entrepreneur taking into account the consumer’s preferences, and the society as a result of transferring to the producer the costs related to the production and operation of products that do not meet ecological requirements;
- “stimulating – the possibility of obtaining an eco-label encourages producers to create products that deserve it, at the same time forcing them to green their technical, system and organizational processes” (Kazmierczak-Piwko et al., 2017).

The importance of ecolabelling is also due to the fact that there is a fundamental asymmetry of information about the product and its parameters between the producer and the consumer. As F. Rubik notes, “In order to cope with asymmetric information, consumers need support in their purchasing activities provided by different tools. There is a widespread arena of different approaches to transmit this information, there are qualitative approaches using symbols and logos, and there are quantitative approaches presenting quantitative and numeric information in different units.” (Rubik, 2015).

Q. Zhang, J. Mi, H. Shen argue that Green Labelling is an important initiative to tackle environmental degradation and encourages more countries and regions to embark on a sustainable development path to protect the environment (Zhang et al., 2019)”. At the same time, as noted by A. Lewandowska et al., “information on the environmental performance of products or organizations plays an increasingly important role in consumer decisions” (Lewandowska et al., 2018).

Decisions that should promote the process of greening consumption, manifested, among other things, in the growth of:

- a) (...) the interest in the consumption of ecological food, ecological non-food goods, ecological tourist services, etc.;
- b) (...) the sense of consumer responsibility for making decisions about the use of an “organic” diet, boycotting products harmful to the environment” (Witek, 2011) and finally achieving the level of sustainable consumption (integrating the pur-

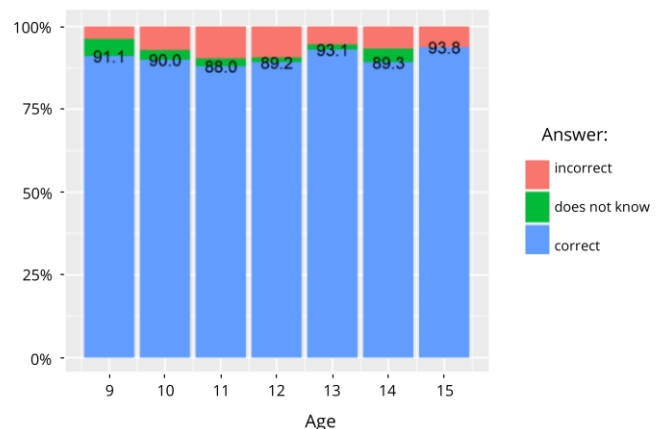
suit of a triad of positive effects: social, economic and environmental), which consists in “consuming material goods and services sufficient to meet basic needs and achieve a higher quality of life, minimizing the consumption of natural resources as well as environmentally harmful materials” (Grzega, Kieźel, 2017).

Hence, the willingness to diagnose this aspect was dictated by the assumption that the ability of young consumers to read the importance of eco-labels in the market choice process may be a key factor in the pursuit of sustainable consumption and at the same time the basic instrument of operationalization of the assumptions of the Sustainable Development concept in the process of market response of the demand side to products generated by its supply side. As noted by F. Iraldo, R. Grieshammer, W. Kahlenborn “Inadequate market response to eco-labelled products and services is, in the opinion of enterprises, also associated with a lack of awareness and information on the part of consumers, as well as insufficient promotion and inadequate recognition of the eco-label” (Iraldo et al., 2020).

### 3. Results

A diagnosis of the ability to identify 11 selected, popular graphic symbols placed on ecological consumer products, aimed at assessing the ability to identify products with better environmental parameters by young consumers.

#### 3.1. Symbol 1 – Label name: “The Mobius Loop” (Londons Global University)

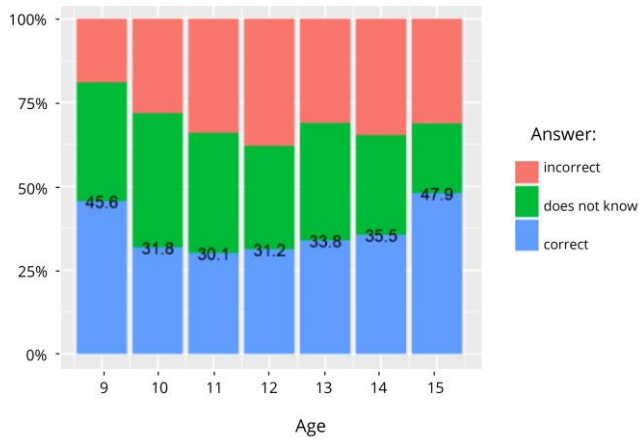


Test for the ratio:  $X\text{-squared} = 13.925$ ,  $df = 12$ ,  $p\text{-value} = 0.30552$

**Fig. 1.** Identification of the “Mobius Loop” eco-label in different age groups

The analysis of the answers given by the respondents manifests a very good recognition of this eco-label at the level of around 90% of correctly indicated answers.

**3.2. Symbol 2 – Label name: „Not Tested on Animals” (Urząd Miasta Katowice)**

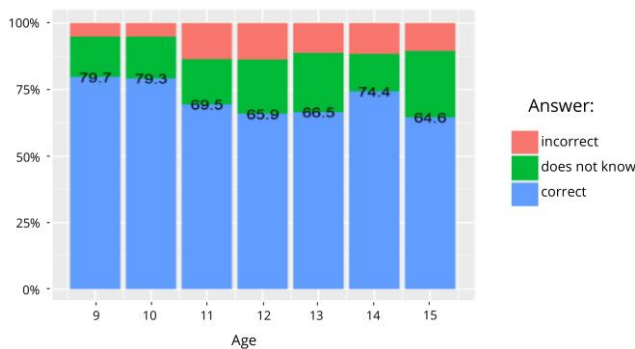


Test for the ratio:  $X\text{-squared} = 24.481, df = 12, p\text{-value} = 0.01748$

**Fig. 2.** Identification of the “Not tested on animals” eco-label in different age groups

The analysis of Fig. 2 shows poor knowledge of this eco-label, as the maximum level of correct answers indicated by the group of 9 and 15-year-olds did not exceed 48%. It is worth noting, however, that in the case of this eco-label there is a statistically significant relationship between the age and how the students respond, as these two groups clearly more often manifest the correct answers, i.e. 9-year-olds at 45.6% and 15-year-olds at 47.9%.

**3.3. Symbol 3 – Label name: “EU Ecolabel – European Daisy” (European Commission)**

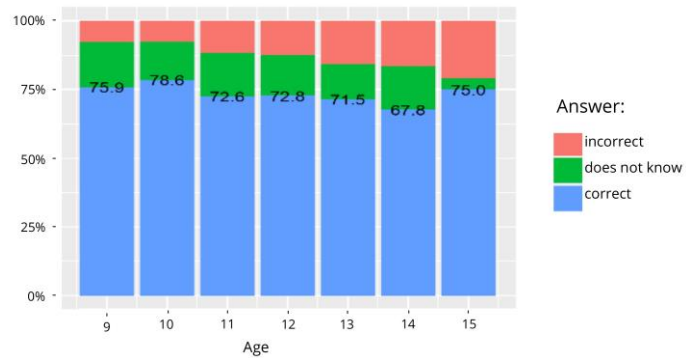


Test for the ratio:  $X\text{-squared} = 28.197, df = 12, p\text{-value} = 0.00518$

**Fig. 3.** Identification of the “EU Ecolabel - European Daisy” eco-label in

This symbol (Fig. 3) is best identified by learners aged 9 and 10, indicating the correct answer at a level exceeding 79% in both cases. In general, it can be concluded that the European ecolabel, compared to other ecolabels analysed in the study, is well recognizable by learners and in each of the analysed age groups the ability to identify it does not fall below 64.6%.

**3.4. Symbol 4 – Label name: „EU organic logo” (European Commission)**

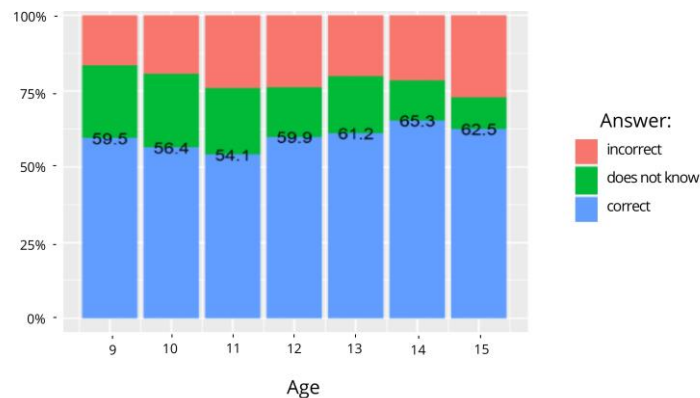


Test for the ratio:  $X\text{-squared} = 20.576, df = 12, p\text{-value} = 0.05694$

**Fig. 4.** Identification of the “EU organic logo” eco-label in different age groups

“EU organic logo” is another eco-label that is relatively well recognized by the respondents. In the analysed age groups, the respondents indicate at least 67.8% of correct answers - which can be considered a good result. Source: own study based on research results

**3.5. Symbol 5 – Label name: „CE marking” (European Union)**

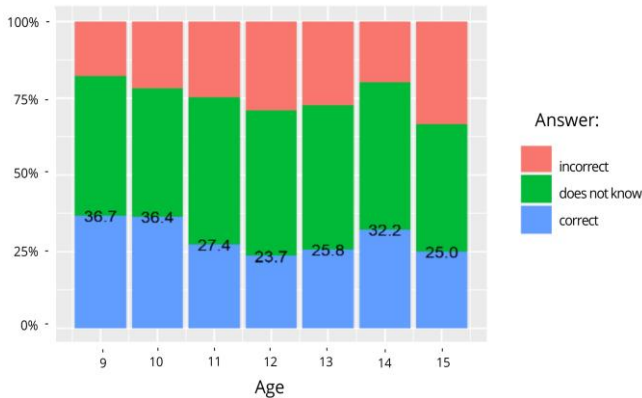


Test for the ratio:  $X\text{-squared} = 17.114, df = 12, p\text{-value} = 0.14536$

**Fig. 5.** Identification of the “CE” eco-label in different age groups

As a result of the conducted research, it was found that the number of correct answers regarding the recognition of the meaning of this symbol in each age group exceeds 54%.

**3.6 Symbol 6 – Label name: „FAIRTRADE Mark” (FAIRTRADE INTERNATIONAL)**

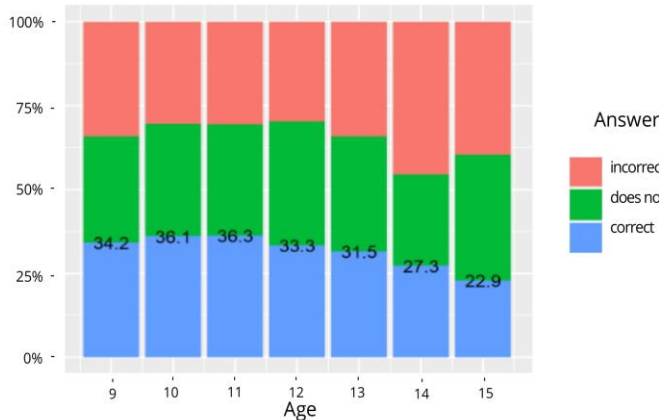


Test for the ratio: X-squared = 21.081, df = 12, p-value = 0.04921

**Fig. 6.** Identification of the “FAIRTRADE Mark” label in different age group

As shown in Fig. 3.7 above, the conducted research showed a relatively low ability to identify this symbol. Among learners aged 12, only 23.7% correctly defined the meaning of this label, and in the age group of 9-year-olds 36.7%.

**3.7. Symbol 7 – Label name: „Energy Star” (ECOLABEL INDEX)**

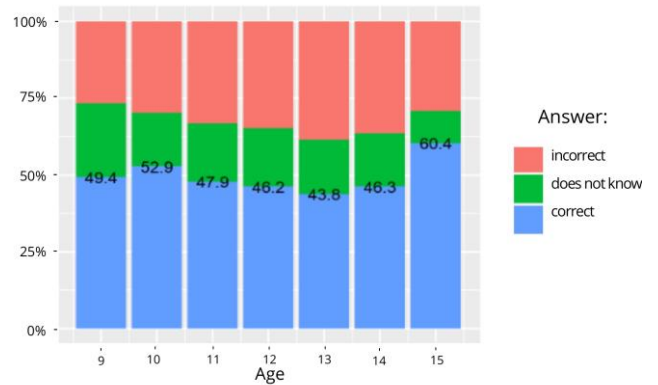


Test for the ratio: X-squared = 15.617, df = 12, p-value = 0.20944

**Fig. 7.** Identification of the “Energy Star” eco-label in different age groups

In the case of the “Energy Star” mark, only 22.9% of 15-year-olds indicated the correct meaning of this symbol, the highest level of the ability to recognize this eco-label was found in the group of 11-year-olds, in which 36.3% of learners indicated the correct answer regarding the meaning of this symbol.

**3.8. Symbol 8 – Label mark: „Der Grüne Punkt” (Der Grüne Punkt)**

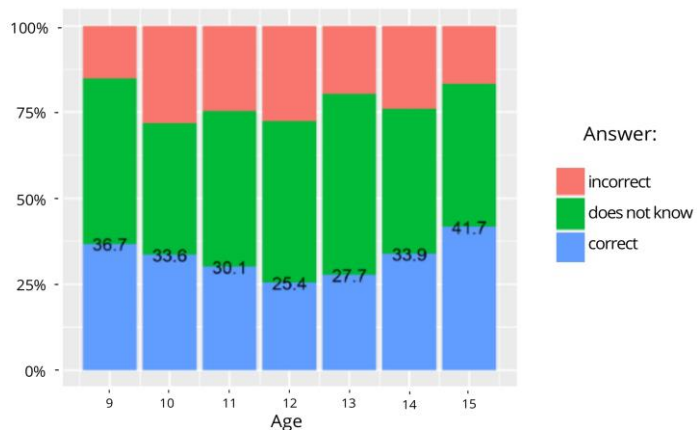


Test for the ratio: X-squared = 12.494, df = 12, p-value = 0.40688

**Fig. 8.** Identification of the “Der Grüne Punkt” eco-label in different age groups

In the case of the "Der Grüne Punkt" eco-label, its significance was best identified by a group of 15-year-olds, in which over 60% of respondents indicated the correct answer. The group of 13-year-olds was characterized by the lowest level of knowledge of this symbol, in the case of this group the recognition of the symbol was at the level of 43.8%.

**3.9. Symbol 9 – Label name: „Compostability Mark of European Bioplastics” (ECOLABEL INDEX)**



Test for the ratio: X-squared = 23.521, df = 12, p-value = 0.02362

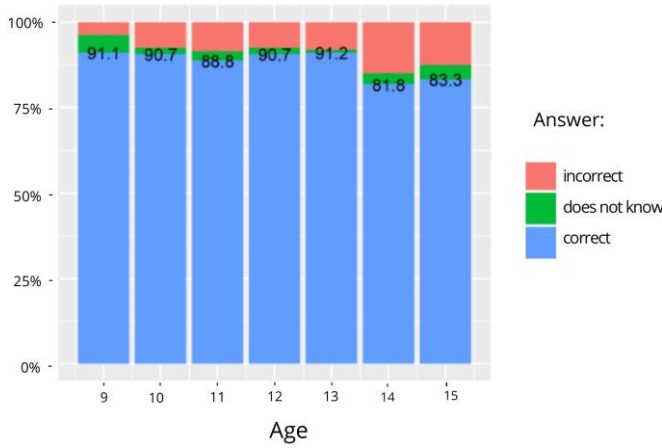
**Fig. 9.** Identification of the “Compostability Mark of European Bioplastics” eco-label in different age groups

“Compostability Mark of European Bioplastics” - is another ecological symbol that was “poorly” recognizable by the surveyed learners. In none of the age groups the number of correct indications of its importance exceeded the level of 42%. The highest ability to identify the meaning of this symbol was demonstrated by a group of 15-year-olds - at the level of



41.7% of correct answers. And the lowest group of 12-year-olds was only 25.4%.

**3.10. Symbol 10 – Label name: “Keep it clean” (Urząd Miasta Katowice)**

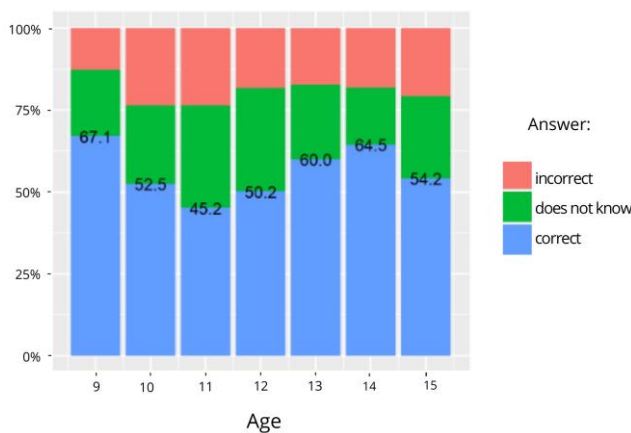


Test for the ratio: X-squared = 18.355, df = 12, p-value = 0.10533

**Fig. 10.** Identification of the “Keep it clean” eco-label in different age groups

“Keep it clean” is, next to “Mobius Loop”, the best identified eco-label among the studied population of learners. As shown in Figure 10 in each of the groups the ability to identify the meaning of this symbol exceeded the value of over 80%, which should be considered a very good result. Among the analysed age groups, this symbol was best recognized by 13-year-olds at the level of 91.2% of correct answers, and the worst by 14-year-olds at 81.8% - which should be considered a very good result anyway from the perspective of the conducted research.

**3.11 Symbol 11 – Label name: “Ozone friendly” (EDI)**



Test for the ratio: X-squared = 30.556, df = 12, p-value = 0.0023

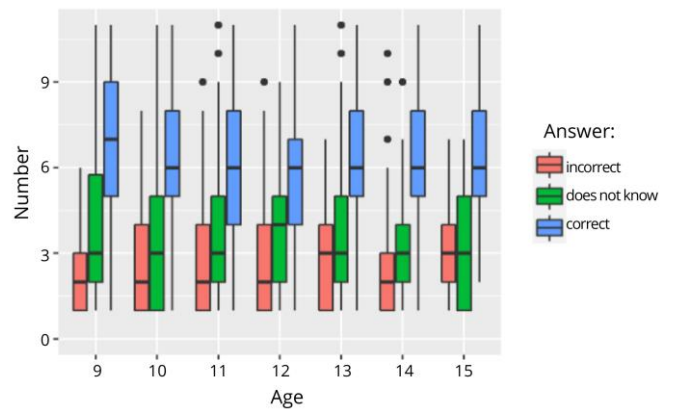
**Fig. 11.** Identification of the “Ozone friendly” eco-label in different age groups

The analysis of Fig. 11 allows concluding that the best ability to identify the meaning of this symbol was demonstrated by the group of 9-year-olds with the result of 67.1% of correct answers. On the other hand, 11-year-olds identified this sign the worst, with the result of 45.2% of correct answers.

During the research process, the next issue analysed was the number and structure of correct answers in individual age groups.

**Table 1.** The number and structure of answers in particular age group

Age (years old)	Correct answer			Answer “I don’t know”			Incorrect answer		
	Q1	Me	Q3	Q1	Me	Q3	Q1	Me	Q3
9	5	7	9	2	3	6	1	2	3
10	5	6	8	1	3	5	1	2	4
11	4	6	8	2	3	5	1	2	4
12	4	6	7	2	4	5	1	2	4
13	5	6	8	2	3	5	1	3	4
14	5	6	8	2	3	4	1	2	3
15	5	6	8	1	3	5	2	3	4



**Fig. 12.** The number and structure of answers in particular age groups

The analysis of Fig. 12. And the numerical data contained in Tab. 1 allowed us to conclude that:

-In the group of 9-year-olds: The bottom quartile Q1=5 indicates that ¼ of the students correctly recognize no more than 5 of the 11 symbols included in the survey. The upper quartile Q3=9 indicates that ¾ of the examined age group correctly recognizes a maximum of 9 symbols. This means that in this age group only ¼ of students correctly recognize more than 8 symbols.

- In the group of 10-year-olds: The bottom quartile Q1=5 indicates that ¼ of the students correctly recognize no more than 5 of the 11 symbols included in the survey. The upper quartile Q3=9 indicates that ¾ of the examined age group correctly recognizes a maximum of 8 symbols. This means that in this age group only ¼ of students correctly recognize more than 7 symbols.
- In the group of 11-year-olds: The bottom quartile Q1=4 indicates that ¼ of the students correctly recognize no more

than 4 of the 11 symbols included in the survey. The upper quartile Q3=8 indicates that ¾ of the examined age group correctly recognizes a maximum of 8 symbols. This means that in this age group only ¼ of students correctly recognize more than 7 symbols.

- In the group of 12-year-olds: The bottom quartile Q1=4 indicates that ¼ of the students correctly recognize no more than 4 of the 11 symbols included in the survey. The upper quartile Q3=7 indicates that ¾ of the examined age group correctly recognizes a maximum of 7 symbols. This means that in this age group only ¼ of students correctly recognize more than 6 symbols.
- In the group of 13-year-olds: The bottom quartile Q1=5 indicates that ¼ of the students correctly recognize no more than 5 of the 11 symbols included in the survey. The upper quartile Q3=8 indicates that ¾ of the examined age group correctly recognizes a maximum of 8 symbols. This means that in this age group only ¼ of students correctly recognize more than 7 symbols.
- In the group of 14-year-olds: The bottom quartile Q1=5 indicates that ¼ of the students correctly recognize no more than 5 of the 11 symbols included in the survey. The upper quartile Q3=8 indicates that ¾ of the examined age group correctly recognizes a maximum of 8 symbols. This means that in this age group only ¼ of students correctly recognize more than 7 symbols.
- In the group of 15-year-olds: The bottom quartile Q1=5 indicates that ¼ of the students correctly recognize no more than 5 of the 11 symbols included in the survey. The upper quartile Q3=8 indicates that ¾ of the examined age group correctly recognizes a maximum of 8 symbols. This means that in this age group only ¼ of students correctly recognize more than 7 symbols.

At the same time, the analysis of the median value for individual groups indicates that in each age group the number of correct answers, excluding 9-year-olds, is at a similar level.

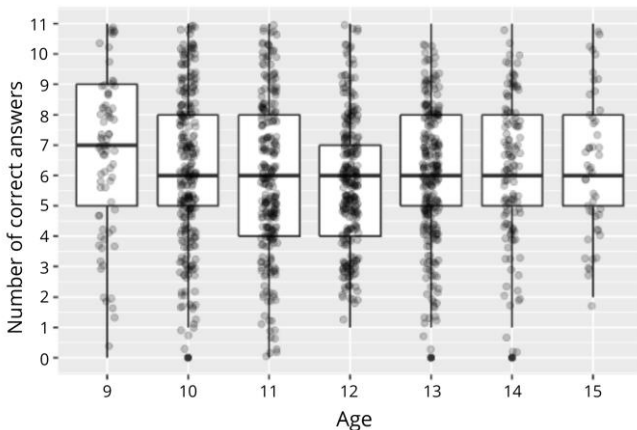


Fig. 13. Distribution of correct answers (graphic presentation)

Fig. 13 is a generalization of the information contained in the box plot in Fig. 12 with additionally marked points showing the number of correct answers in particular age groups. To

better visualize the clustering of these numbers, the jittered point method was used.

### 3.13 Eco-labels identification – frequency of correct answers

Another analysed aspect that allows drawing general conclusions as to the ability to identify individual eco-labels for the entire studied population of learners was the frequency of correct answers to individual ecological symbols included in the questionnaire form (Fig. 14).

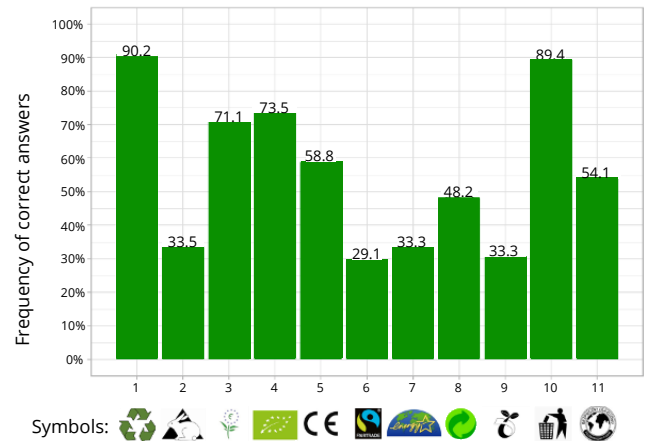


Fig. 14. The frequency of correct answers for each symbol

A comparative analysis of the frequency of correct answers provided by the entire surveyed population of learners shows that:

- -in the case of 54.5% of eco-labels (1,3,4,5,10,11), their correct recognition (identification of significance) in the entire studied population exceeded 50%, and in the case of eco-labels 1,3,4,10 it exceeded the level of 70% - which can be considered a positive result,
- -in the case of 45.5% of eco-labels (2,6,7,8,9), their recognition (identification of significance) in the studied population did not exceed 49%, which is undoubtedly an area for improvement as a result of educational processes. This conclusion is also confirmed by the analysis of the average frequency of correctly given answers by the entire learner population, amounting to 55.6%. This means that the average learner from the analysed group is able to correctly identify the meaning of ~ 6 out of the 11 environmental labels presented.

Another element of the analysis was the fraction of learners who recognized a certain number of symbols (Fig. 15).

As the above histogram shows, 3.9% of the learners correctly identified the meaning of all eco-signs, and 1% of the learners did not identify any. Optimistic information is provided by the analysis of the shape of the graph, a significant part of the distribution is clustered (cumulative mass) on the right side of the histogram, with more correct answers compared to the left side.

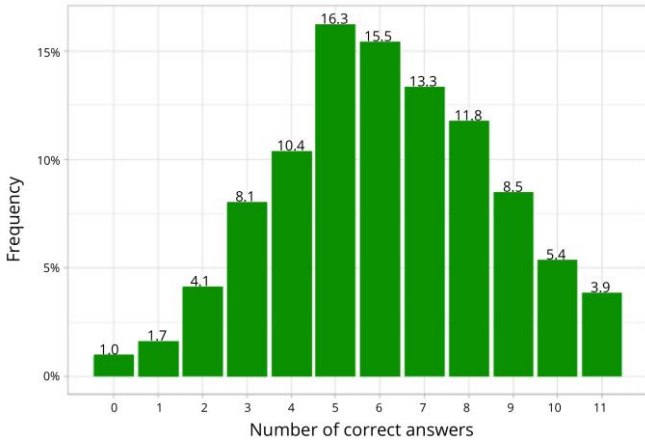


Fig. 15. Distribution of correct answers regarding eco-labels

### 3.14. Analysis of the impact of learners’ participation in the parents’ purchasing decision-making process on their ability to identify products with better environmental parameters (labelled with the eco-label)

The analysis of the impact of learners’ participation in parents’ purchasing decisions on the ability to identify ecological symbols placed on products is another element analysed in the studied population of children from primary schools. During the survey, learners were asked whether their parents consulted them about their purchasing decisions. Then, an attempt was made to determine whether there is an impact resulting from the participation of children in the process of making consumer decisions (as a result of consultations) on the ability to identify products with better environmental parameters (Fig. 16).

Table 2. Children’s participation in the purchasing consultation process and the number of correct answers

	Correct answer			Answer “I don’t know”			Incorrect answer		
	Q1	Me	Q3	Q1	Me	Q3	Q1	Me	Q3
<b>All purchasing decisions (1)</b>	5	6	8	2	3	5	1	2	3
<b>Only those on the learner (2)</b>	5	6	8	2	3	5	1	2	4
<b>No consultation of any purchasing decisions (3)</b>	4	5	7	2	4	6	1	2	4

The analysis of Fig. 16 may indicate a slightly better ability to identify eco-labels in the group of learners with whom parents consult the purchasing process. This is indicated by the quartile values (Q1, Q3) for the correct identification of eco-labels (Tab. 2), which are higher in the case of consulting purchases with children.

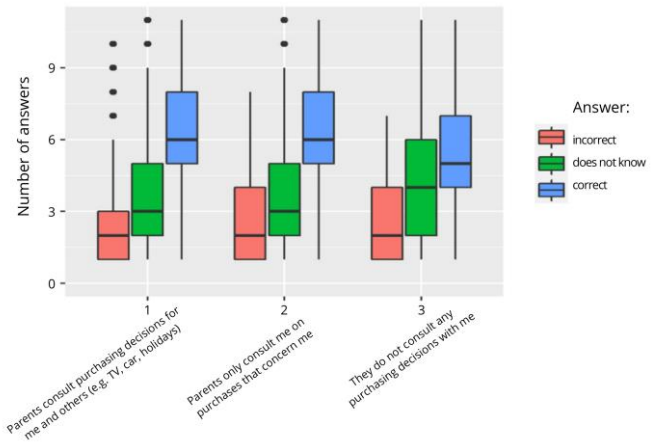


Fig. 16. Children’s participation in the purchasing consultation process and the number of correct answers

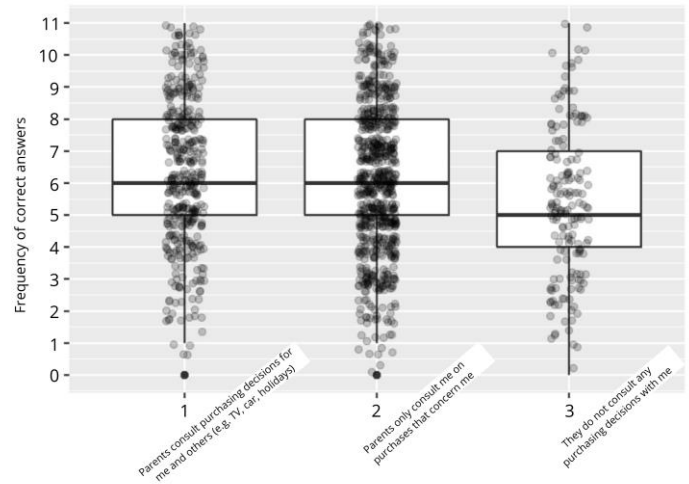


Fig. 17. Distribution of correct answers according to the type and scope of consultation (graphic presentation)

The above box plot (Fig. 17) is a graphic generalization of the information contained in Fig. 16 with additionally marked points showing the number of correct answers according to the type of children’s participation in the process of making purchasing decisions by parents. To better visualize the clustering of these numbers, the jittered point method was used. The survey also asked the respondents about the factors influencing their consumer decisions (regarding food products – see Tab. 3) - among the ten purchase factors, “Product markings (e.g. signs that the product is organic)” were included. It turns out that only 12.2% of the interviewed learners indicated this factor as decisive for purchasing a food product. This factor was ranked 8 out of 10 in terms of the number of indications for listed factors in the survey form. This fact clearly shows the relatively low importance of ecolabelling of food products in the process of making consumer decisions by the studied group of learners.



**Table 3.** Factors determining the purchase of food products

Description	Number	Percentage
Product composition	688	51.9%
Product price	862	65%
Product brand	258	19.5%
Attractive packaging	75	5.7%
Environmentally friendly packaging	260	19.6%
Product popularity	170	12.8%
Product advertising	41	3.1%
The country the product comes from	225	17%
Product markings (e.g. symbols that the product is organic)	162	12.2%
Product feedback	268	20.2%

## 5. Summary and conclusion

The conducted research revealed large disproportions in the recognition of eco-labels, both in individual age groups and in relation to various eco-labels. In many cases, the recognition of eco-labels is below 50% (including the Compostability Mark of European Bioplastics, Energy Star, FAIRTRADE Mark), and this applies to higher age groups (13-15 years old), which should be considered an unfavourable phenomenon. Moreover, there are no visible learning outcomes and the consolidation of knowledge. In most cases, the recognition of a particular symbol deteriorated with age, at least in the next few years (10-13 years old), and sometimes permanently. Therefore, the education system lacks actions to consolidate the acquired knowledge in the field of ecolabeling, which results in the indicated phenomena.

To sum up, the analysis carried out in this article allows for the formulation of the following detailed conclusions:

- 1) A comparative analysis of the median value of correct answers in terms of the ability to identify the importance of individual eco-labels placed on consumer products presented in the questionnaire form showed that in each age group the number of correct answers (excluding the group of 9-year-olds) was at a similar level. This may demonstrate that with the age of the studied population of learners, i.e. with an increase in basic knowledge provided by the education system and with participation in the socialization process, the level of the ability to identify products with better environmental parameters by means of eco-labels placed on products does not increase.
- 2) A comparative analysis of the frequency of correct answers provided by the entire surveyed population of learners showed that:
  - in the case of 54.5% of the eco-labels included in the questionnaire form, their correct recognition (identification of meaning by learners) in the entire surveyed population exceeded the value of 50%, and in the case of 45.5% of the eco-labels included in the questionnaire form, their correct recognition value exceeded the level of 70% - which proves their relatively high recognition;
  - in the case of 45.5% of eco-labels included in the questionnaire form, their correct recognition (identification of meaning by learners) in the surveyed population did not exceed 50%, which undoubtedly constitutes an area for improvement as a result of the intensification of educational processes in this area. This conclusion was also confirmed by the analysis of the average frequency of correct answers by the entire student population amounting to 55.6%, which showed that, on average, the surveyed elementary school student is able to correctly identify the meaning of the ~ 6 out of 11 environmental labels presented in the survey.
- 3) The analysis of the impact of learners' participation in parents' purchasing decisions on the ability to identify ecological symbols placed on products showed that the quartile values (Q1, Q3) for the correct identification of eco-labels (Fig. 16) are greater when parents consult their purchases with their children. This may mean that the participation of children in the purchasing decision-making process may support building the ability to identify products with better environmental properties (with the eco-label).
- 4) Only 12.2% of the interviewed learners indicated the eco-label as a decisive factor in purchasing a food product. This factor was ranked 8 out of 10 in terms of the number of indications for all factors included in the questionnaire form. This fact may demonstrate a relatively low importance of ecolabelling of food products in the process of making consumer decisions by the studied group of learners.
- 5) In the surveyed group of 9-year-olds: 25% of learners correctly recognized no more than 5 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 9 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 8 eco-signs.
- 6) In the surveyed group of 10-year-olds: 25% of learners correctly recognized no more than 5 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 8 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 7 eco-signs.
- 7) In the surveyed group of 11-year-olds: 25% of learners correctly recognized no more than 4 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 8 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 7 eco-signs.
- 8) In the surveyed group of 12-year-olds: 25% of learners correctly recognized no more than 4 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 7 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 6 eco-signs.
- 9) In the surveyed group of 13-year-olds: 25% of learners correctly recognized no more than 5 out of 11 eco-labels included in the survey. And 75% of the surveyed age

group correctly recognized a maximum of 8 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 7 eco-signs.

- 10) In the surveyed group of 14-year-olds: 25% of learners correctly recognized no more than 5 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 8 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 7 eco-signs.
- 11) In the surveyed group of 15-year-olds, 25% of learners correctly recognized no more than 5 out of 11 eco-labels included in the survey. And 75% of the surveyed age group correctly recognized a maximum of 8 eco-signs. This means that in this age group only 25% of learners correctly recognized more than 7 eco-signs.
- 12) A statistical analysis of the fraction of learners who recognized a certain number of symbols at the same time, showed that:
  - 3.9% of learners correctly identified the meaning of all eco-labels and only 1% of learners did not identify any.
  - a significant part of the distribution (Fig. 15) was concentrated (cumulated mass) on the right side of the histogram, with a greater number of correct answers compared to the left side with a smaller number of correct answers – which should be considered positive information.

To sum up, on the basis of the conducted research, it should be stated that among the surveyed group of young consumers, actions should be taken to raise awareness of sustainable consumption, and this requires coherent and varied activities at all levels of their education. Therefore, firstly, educational processes should be intensified in all surveyed age groups in the field of sustainable consumption and the ability to identify products with better environmental parameters – by emphasizing the issue of sustainable consumption and ecolabelling in curricula, on subjects in the field of ecological and economic education.

Secondly, during meetings of educators with parents, the importance of children's participation in making consumer decisions by parents should be signalled, as a process that, as the research results have shown, can contribute to building sustainable consumer attitudes among children by providing them with practical skills and responsible behaviour patterns on the market. It is also necessary to realize that it is one of the important processes of gaining maturity of young consumers, especially in the conditions of increasing their economic and technical purchasing possibilities.

Another aspect is the need to organize cyclical events, contests, competitions on ecolabelling and its importance in the modern world, as well as sustainable consumption, saving resources, waste management, and many different actions to raise environmental awareness.

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## 儿童和青少年的可持续消费

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### 關鍵詞

可持續消費  
作為消費者的孩子  
年輕消費者  
可持續發展  
生態標籤

### 摘要

年轻消费者（儿童和青少年）在现代消费市场的运作中发挥着越来越重要的作用。因此，在这一群体中推广可持续的生态消费模式变得越来越重要。这篇文章的作者分析了对一组 1326 名 9 至 15 岁儿童进行的调查的结果。目的是诊断来自波兰市场的被研究的年轻消费者群体的消费意识和功能模式，并为他们的生态、经济和社会教育过程制定一套建议，旨在建立可持续的消费模式。在研究过程中，试图诊断识别放置在消费品上的 11 个选定的、流行的、亲生态的图形符号的能力，旨在评估年轻消费者识别具有更好环境参数的产品的技能。使用以下方法通过 R-project 程序分析收集的经验数据：描述性统计、非参数 Kruskal-Wallis 检验和 Pearson 卡方独立性检验。由于采用了比较分析的方法，对年轻消费者各个年龄组的研究结果进行了比较和解释。研究后，作者得出结论，教育系统缺乏巩固生态标签领域知识的行动，这导致生态标签在个体年龄组和与选定符号相关的识别方面存在很大的不平衡。令人不安的是，只有 12.2% 的受访学习者表示生态标签是购买食品的决定性因素。文章作者认为，在年轻消费者群体中，应采取行动提高对可持续消费的认识，这需要在他们的各级教育中采取一致和差异化的措施。

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