Perception of environmental information materials by youth audiences: Results of a neuromarketing study

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Abstract

The paper presents the results of using eye-tracking technologies to study news materials on environmental topics collected as stimulus material and classified according to their impact on audience perception. The empirical material of the study came from news websites covering environmental issues. For objectivity, we compared two regional media resources – *74.ru* (Chelyabinsk) and *Aktobe Times*. We present our analysis of participants' response to the studied materials and the degree of their influence on the participants' emotional state and behavioral reactions. The paper also supplements the data obtained from content analysis in previous studies and expands the understanding of this issue. The chosen quantitative and qualitative approach to content research allowed us to determine the semantic and stylistic features of constructing ecotexts, determine their connotative characteristics, and classify them by groups, topics, and categories. The paper also contains survey data contributing to a deeper study of the stated problem and focusing on a detailed study of the audience's behavioral responses. The survey data allowed us to confirm the expressed hypotheses and highlight the active areas of interest of the youth readership.

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Alongside the presented conclusions and points of discussion, we expressed the main assumptions highlighting the features of the formation of environmental texts in the news media.

Keywords
Internet media, environmental issues, headline, eye tracker, youth audience.

Introduction
Environmental issues are particularly relevant in society and of primary importance for the economic development of territories losing their investment attractiveness due to unfavorable climates and environmental risk zones. The tools of information influence used by the media shape the audience's perception of the current environmental situation and significantly affect the social well-being of the population. We examined Chelyabinsk, Russia and Aktobe, Kazakhstan, since they are in the same territorial and economic zone and have similar ecological issues.

With the development of the Internet, over 85% of the national population[3] now has Internet access, including young people who actively consume information promoted by the media. Environmental issues are actively discussed online, and this media transparency has exposed certain environmental problems across Russia. At the same time, the populations of regions with a risky environmental situation are more sensitive to such information, since the modern media space sets certain stereotypes, forms a mass attitude towards the territory, and imposes stereotypes on environmentally risky regions.

Environmental issues are particularly acutely perceived by young people living in such high-risk regions since the Internet is their main source of information. Within the framework of the declared relevance and in hopes of developing our researcher in the future, we formulated the following hypotheses:

- Young people are mostly attracted by headlines rather than images;
- Symbiosis between the headline and the image evokes both positive and negative emotions on environmental issues, most often forming an indifferent or sharply negative attitude towards the information received;
- Excessive media pressure on environmental issues generates negative emotions and leads to a destructive perception of the objective environmental reality and the ecological situation by the youth audience.

[3] https://tass.ru/obschestvo/12698757

The respondents in the study were students aged 18 to 20, who belong to generation Z. They are called 'zetas' in the Theory of Generations (Dimock, 2019). The authors of the Theory of Generations divided generations according to the principle of the heterogeneity of the shared values of people who live in the same country but grew up in different historical conditions. Each generation is given a unique name, the most common of which are Baby Boomers, Generation X, Generation Y, and Generation Z (Williams, 2011). One of the most popular activities among students is browsing the Internet (Kalinkin, 2019). Generation Z has unique characteristics and poses special requirements on the market of online services and digital technologies. Their basic requirements include the availability of information, comfortable in formation acquisition, online communication, independent choice of content, voice commands, acquiring user-friendly information in a minimized text form, with images, etc. (Leung, 2004).

We used eye-tracking, survey, and content analysis to test our hypotheses. The formulated hypotheses determined the further stages of our study.

Theoretical framework

In Russian literature, studies on environmental communications and environmental issues in the media deal mostly with the cultural aspect and environmental awareness (Ivanova, 2019). References to environmental culture in Russian society are presented as a condition for the formation of environmental awareness and behavior of the younger generation. It is also argued that ecolinguistics and metaphors play a special role in describing environmental issues (Ivanova, 2021). It is possible to find methodological and historiographic justifications for the formation of environmental themes in the media (Kalinina, 2016), including more fundamental approaches to modern methods of environmental education (Kolesova, 2016).

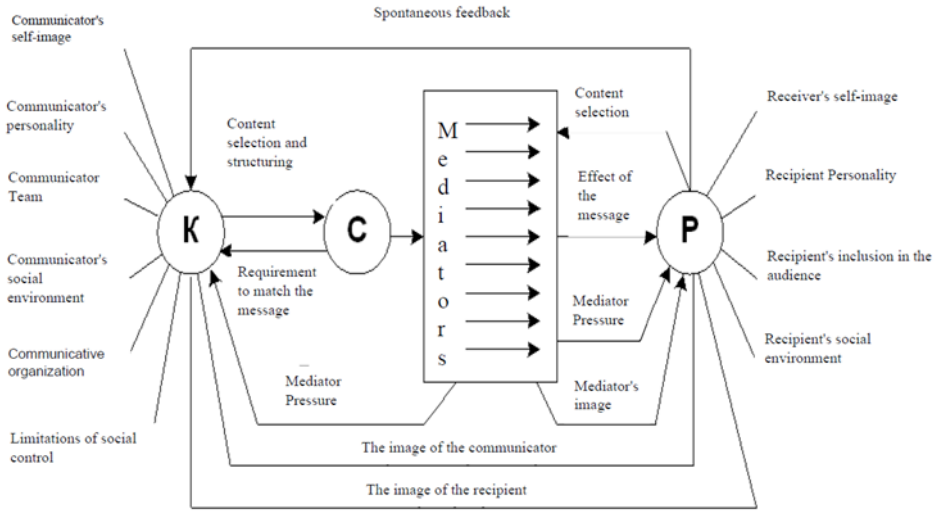
However, Russian scientific expertise is insufficient to fully understand the problem. It is necessary to study ideas and approaches in the field of communication from international researchers, including fundamental theories that formed the classical models of communication processes and the interaction between media and society. We began our search with the models and approaches that are closest to the mechanisms of interaction between the media and society.

The development of environmental issues and increased interest in media resources led us to choose the fundamental theory put forward by Gerhard Maletzke (1963), which is based on the concept of social communication

determined by several characteristics essential for perception. The advantage of the chosen model is the established chain of socio-psychological factors influencing the communicative process, which, in the context of environmental issues of the media, provides for a broader approach to understanding the levers and tools of media influence on the perception of the readership. Relying on Maletzke's model, we accepted the traditional elements of the communication processes (communicator (source), message, mediator and recipient) as key points of analysis and studied additional variables proposed within the framework of the model (*Figure 1*).

Figure 1

Gerhard Maletzke's communication model



The variable of pressure was the most important in the content of this model. It allowed us to determine the nature of environmental texts in the media. Pressure shows that the media, as active intermediaries, shape the situation to increase the ratings of their materials, not thinking about their ultimate responsibility for the state of social well-being of the information recipient.

Following the ideas of Maletzke (1963), we agree that the most important semantic and ideological chain in environmental issues is the answers to the questions: What was said? Who was it said by? How was it said? To whom was it said? In this case, the third element of the message (How was it said?) is the most important in our study since these four elements create a field of communicative

dependencies. This is a special space created when the information is transferred from the communicant to the recipient when receiving feedback on the transmitted message. In the field of communicative dependencies, the environmental dependence originates from the communicator's view of the recipient. The media are guided by the task of enhancing emotional impact. Maletzke's explanation of the communication process using psychological factors is critical to us, since it has a subconscious but colossal effect on the audience's behavior. Environmental materials are filled with such effects. Theories of journalistic text focus on headlines, the main function of which is also to emotionally influence the audience to achieve a particular planned effect. Consequently, headlines can also exert pressure and act as a tool to influence the audience's behavioral responses.

In mass communication, where psychological effects are an integral factor, the message always reaches the recipient through one of the communication channels, and any of these channels modifies the recipient's perception and experience. Consequently, the effect of the message also changes. The media offer a large selection of messages, from which the readership chooses and is influenced by only a few. Notably, the symbiosis of the headline and the image evokes both positive and negative emotions in the audience regarding environmental problems, to a greater extent forming an attitude towards the information received. Then, under the influence of the media, the feedback breaks and becomes uncontrollable and spontaneous, often leaving impressions and stereotypes, which are difficult to get rid of.

Further review of the leading communication theories in the literature allowed us to find several provisions concordant with our hypotheses. We determined that the theory of cognitive dissonance of media influences on the audience and the perception of media information proposed by Leon Festinger (1957) is based on the idea that the media write 'selective' information, which attracts the reader's attention but causes dissonance from the available knowledge (generally favorable on the environmental situation) and the presented information due to the strong pressure of negative facts. A complex model of the media's use of informational influence generates dissonance; pressure can be increased by images and headlines forming the cognitive field. Walter Lippmann's theory of stereotypes (Lippmann, 1916) was persuasive in our research. Lippmann noted that human cognitive capabilities are limited: a person cannot know everything or be totally informed, since the environment is a too complicated and changeable structure. Overcoming the diversity of the world, individuals systematize knowledge about it into various semantic categories. According to

Lippmann, stereotypes initially arise spontaneously due to the 'inevitable need to economize attention'; they contribute to the formation of traditions and habits. The media form a pseudo-ecological environment in the reader's mind, which could be spontaneously shaped by a series of environmental publications and form a stable negative stereotype. The media use stereotypes, which give rise to negative identification of territories.

The concept of Jurgen Habermas (1981) allows us to justify the choice and differentiation of environmental issues, in which we established semantic variations to be used in our content analysis and survey. According to the presented theory, there are three types of acts in communication – constative, expressive and regulatory. The first act makes claims to reality (knowledge, intelligence), the second – to subjective truthfulness (sincerity, feelings, emotions), the third – to correctness (justification) from the standpoint of the normative social order (action). Actions can be rationally disputed from the standpoint of communicative rationality. The media exert a certain influence on the reader's consciousness:

- forming knowledge,
- forming an attitude,
- forming an action/response to the information received.

This relationship allows us to design material based on the principles of knowledge/knowledge, knowledge/attitude, knowledge/action.

In addition to the fundamental theories of mass communications and their current understandings and interpretations, also in regard to young audiences (Aduloju, 2020; Gureeva, Samorodova, Kuznetsova, 2020; Gureeva, Dunas, Muronets, 2021), more and more new scientific viewpoints on neuromarketing technologies in communications are emerging. Eye-tracking has been studied by Russian scientists such as Artemyeva (2021) and Yarosh (2019) who paid attention to the technical issues of conducting and organizing conditions for neuromarketing research, describe the requirements for the operation of iTracking equipment. In addition, attention to the influence of the media on the perception of young people is devoted in the works of foreign scientists Allan, Adam, Carter, and several other experts in the field of mass media communications, who study the impact of environmental risks and man-made consequences covered in the media. The authors of this study complement the paradigm of the established scientific direction with the expansion of iTracking techniques by survey and content analysis based on an interdisciplinary approach.

Methods

In total, 97 students of South Ural State University aged 18 to 22 years (29 young men, 68 young women) participated in our study. Participants were recruited on a voluntary basis, did not receive monetary remuneration, and gave their informed consent to participate in the study. After the eye-tracking study, all 97 respondents completed a survey in a Google form.

The stimulus material was selected and agreed upon through collegiate discussion among our team. The initial stage in selecting the stimulus material was content analysis of public and commercial news sites from Chelyabinsk (Russian Federation) and Aktobe (Republic of Kazakhstan), which are considered regions of 'risk' due to their environmental problems. Stimulus material was selected with consideration of the influence of the issues of environmental content and geographical classification. The time period of Kazakh and Russian sites used for our analysis was determined by a review of publications in 2019 and 2021, as 85% of the information agenda in 2020 was devoted to the topic of COVID-19 pandemic.

The content was grouped into three topics: waste, water, and air. Portions of screenshot of news sites were shown to participants, as eye tracker programs cannot be used to view web pages within a browser.

We selected the news sites of two regions – the Chelyabinsk region of the Russian Federation and Aktobe, Kazakhstan – for the objectivity of our study. Screenshots were taken from *74.ru* and *Aktobe Times*. We reviewed over three hundred news articles and videos from the sites, choosing 150 items from each country (Russia, Kazakhstan). We searched for the articles using the keywords 'ecological issues' and 'ecology'. We were aware that the respondents would be significantly affected by materials from the South Ural site, which is popular among the respondents in this region. However, we believed that content from *Aktobe Times* could also attract attention with its novelty and different means of presenting information, which had also to be taken into account for our study.

The stimulus material, as mentioned above, was divided into three blocks of environmental issues: water quality, air quality, and waste disposal and recycling. Each group consisted of twelve randomly chosen articles which included graphic and textual materials (headlines and subheadings) and logos of cross-media resources (social media). Within these blocks, we distinguished subtopics of environmental issues (*Table 1*).

Table 1

Subtopics of environmental issues in the Internet media

Topical unit	Subtopic
Air	Pipe cleaning, vehicle exhaust, smoke from fires, unfavorable meteorological conditions, smell from illegal dump sites, stench from emissions
Water	Removing algae from bodies of water, water pollution by emissions, poisoned water, death of fish in water, drying out of canals, removing tires from bodies of water, development of the area near reservoirs
Waste	Unauthorized dump sites, volunteer clean-ups, waste reclamation, separation of waste, creation of landfills, unsanitary conditions near garbage zones, absence of trash cans in the streets and courtyards

The selected information resources have three areas of influence: 1) they form knowledge, 2) they encourage action, 3) they cause reflection in the form of emotional responses to the information received. The stimulus materials were grouped according to these areas, then, a survey was formed based on this principle.

The materials reflecting a particular problem and the reasons for its appearance were placed in the problem-problem category, which is aimed at expanding knowledge and ideas about certain phenomenon, i.e., affecting the cognitive resources of the information media consumers. Materials encouraging action on and solution of an environmental problem were placed in the problem-solution category, which includes a behavioral principle, i.e., the audience's behavioral approach, where the key task is not passive presentation of the material, but a call for specific action.

The materials aimed at the audience's affective (sensory-emotional) responses were placed in the category of problem-reflection. The main task of this stimulus material is to cause emotional responses from information media consumers. Such negative reactions as fear, anxiety, emotional stress, irritation are also noted. Eye-tracking studies record the movement of the respondent's eyes and demonstrate the degree to which they fixate on a particular content area; however, eye-tracking tools do not work with 'meaning' or mechanisms of evaluative action. Therefore, to determine negative stimuli (or rather, the textual and visual content of stimuli) in our further content analysis, we were guided by the Ecological Dictionary (Ekologia, 2020), which defines words with

negative connotation as threat words. The survey conducted immediately after the eye-tracking study contained a block of questions asking respondents to describe the feelings and emotions they experienced after viewing the stimulus material.

Table 2

The relationship between the categorical distribution of the environmental material and the main theoretical approaches of theories of mass communication

Information material category	Aspect of influence on the audience's consciousness
Problem-problem	Cognitive
Problem-solution	Behavioral
Problem-reflection	Affective (emotional)

Next, we carried out a quantitative analysis to determine the frequency at which environmental issues were mentioned in the selected materials (*Table 3*).

Table 3

The frequency of mentioning environmental issues in the chosen materials, by categories

Category	Media resource	Air	Water	Waste
Problem-problem	*74.ru*	11	16	24
	1obl.ru	7	10	11
	timeskz.kz	3	8	10
Problem-solution	*74.ru*	9	14	18
	1obl.ru	7	6	10
	timeskz.kz	4	3	8
Problem-reflection	*74.ru*	23	16	19
	1obl.ru	8	5	10
	timeskz.kz	3	2	9
Total mentions per categories		75	80	119
Total number of all mentions		274		

The content of each of the presented stimuli is shown in *Table 1*. The characteristics of the verbal components of the stimuli will be considered separately through content analysis.

The eye-tracking study was conducted using an Eye Tribe Tracker (hereinafter referred to as eye tracker), a commercial product for desktop computers and tables allowing one to control the user's vision. The eye tracker has a small hardware module (20cm x 1.9cm x 1.9cm, 70 grams) which connects using a USB 3.0 port (integrated with iMotions).

The chosen eye tracker is compatible with iMotions version 8.2.4, which is eye-tracking software able to determine where a person is looking based on information extracted from the person's face and eyes. The eye tracker device uses a camera to track the movement of the user's eyes. The camera tracks even the smallest movements of the users' pupils by capturing images and running them through computer vision algorithms (NPR, 2012). The algorithms read the 'coordinates of the eye on the screen' and can help the program to determine where the user is looking. The algorithms also work with a camera sensor and special lighting to improve the interaction with the user in various conditions (Etherington, 2020). The eye tracker must be calibrated to be able to detect the user's pupils and determine the unique eye characteristics. This is necessary to improve the eye-tracking accuracy.

The eye tracker has an average accuracy of about 0.5 degrees of vision angle and can identify and track the eye movement with millimeter precision. The eye coordinates are calculated relative to the screen the person is looking at and are represented by a pair of coordinates (x, y) set in the coordinate system of the screen. The eye tracker primarily works through hardware detection of: a) the center of the pupil; b) the reflection of the cornea in the form of a small bright flare. Eye tracking systems track, process, and demonstrate the trajectory of eye movements between different fixation points (saccades), then demonstrate heat maps with the highest frequency fixation zones (shown as bright red) and the lowest frequency zones (changing from yellow to blue with decreasing frequency). We recorded the heat maps of particular attention zones: headline, text, and image.

We used a fixed eye tracker for our study. The study was carried out under electrically-screened dim lighting, in a specially equipped noise-insulated room (laboratory) with grey walls. The laboratory was fitted with two tables opposite each other and two computers. The participant sat at one of the tables. The eye tracker was installed under the computer screen opposite the participant. The study participant was approximately 60 cm away from the screen and tracker. This distance is necessary to eliminate the 'head movement compensation error' effect. The calibration was carried out using a point moving randomly across the monitor screen. Readings and the dependence of eye movements were adjusted

accordingly. The stimulus materials were then demonstrated on the screen. According to the conditions of the study, the participants should not wear glasses or any other items which could create glare and distort the results of the study.

The information received from the eye tracker was recorded in OGAMA for further processing and interpretation. The eye-tracking study took into account both visual data – a comparison of the respondent's behavioral strategies according to their level of attention by superimposing the tracking results on the stimulus images – and statistical data, demonstrating the number of fixations, the duration of each fixation, and the total fixation time in the areas of interest. The most fixed zones were determined by analyzing the degree of eye movement and the heat maps of each participant by superimposing (combining) the results of all the participants. The initial image shown to each participant was a cross in the center of a gray background. Then, the stimulus materials and the cross were demonstrated in turn. This is necessary for all the stimulus materials to be in equal starting conditions and have equal starting opportunities to influence the participant (*Table 4*).

Table 4

Description of the stimulus material

CODE	WATER		
	Headline	**Image**	**Description**
Ex.1 (S2)	Drilling of a new well began in the village of Shumaki, Korkinsky district, after mercury was discovered in the water / problem – solution https://www.1obl.ru/news/o-lyudyakh/v-derevne-shumaki-korkinskogo-rayona-posle-obnaruzheniya-rtuti-v-vode-nachali-burit-novuyu-skvazhinu/	Positive (a bird drinking water)	The material deals with the problems of water quality in settlements; the image has a central object (a bird) in the foreground and a blurred solid green background. The problem itself is not shown.

Ex.2 (S4)	How long does Fershampenuaz have to live without treatment facilities? / problem-problem. https://www.1obl.ru/news/o-lyudyakh/skolko-fershampenuazu-zhit-bez-ochistnykh-sooruzheniy/	Positive (image of water)	The material deals with the problems of water quality in settlements; the image shows water reservoirs. The problem itself is not shown.
Ex.3 (S6)	A contractor was chosen in Chelyabinsk to clean up the Miass river / problem-solution https://www.1obl.ru/news/ekonomika/v-chelyabinske-vybrali-podryadchika-dlya-ochistki-reki-miass/	Negative (a polluted reservoir)	The material deals with the problems of reservoirs in settlements. A close-up shows the problem (a polluted river).
Ex.4 (S26)	We cannot see the banks: unexpected paths to the Miass River will be cleaned in Chelyabinsk / problem-solution https://74.ru/text/gorod/2020/08/05/69403411/	Negative (a polluted bank)	The material deals with the problems of reservoirs and their surroundings in settlements. A close-up shows the problem (contaminated area near the river).
Ex.5 (S28)	Fish in the Miass River in Chelyabinsk could have died due to a sewer leak / problem-emotion https://www.kommersant.ru/doc/3981489	Negative (dead fish in the reservoir)	The material deals with the problems of reservoirs and their surroundings in settlements. A close-up shows the problem (dead fish).

Ex.6 (S30)	The person in charge of the state of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake / problem – solution https://74.ru/text/gorod/2019/07/24/66172381/	Neutral (a reservoir, people on the shore)	The material deals with the problems of reservoirs, which are critical environmental, recreational, and health-improving natural objects. The image provides a general view of the administrative review process.
CODE	*Aktobe Times* newspaper – aktobetimes@list.ru		
Ex.7 (S38)	Boron and chromium will be cleaned up. The Ministry of Ecology considers cleaning the waters of the Ilek River / problem-solution https://timeskz.kz/75272-ochistyat-ot-bora-i-hroma-v-minekologii-zadumalis-ob-ochistke-vod-reki-ilek.html	Neutral (a natural landscape with the reservoir)	The material deals with the problems of natural reservoirs and the issues of cleaning rivers. The image shows the river outside the countryside.
Ex.8 (S40)	A local ecological catastrophe is brewing in the Aktobe region / problem-problem https://timeskz.kz/45115-ekologicheskaya-katastrofa-mestnogo-masshtaba-nazrevaet-v-aktyubinskoy-oblasti.html	Neutral (a natural landscape with the reservoir)	The material deals with the problems of natural reservoirs and the issues of cleaning rivers. The image shows a river outside the countryside landscape with a silhouette (shadow) of a person in the foreground on the left.
Ex.9 (S42)	Akbulak is afraid of the consequences of wastewater treatment at Aksu Ferroalloys Plant / problem-problem http://aktobetimes.kz/7627-akbulak-boitsya-posledstviy-ot-ochistki-stokov-na-azf.html	Neutral (a water storage and purification device)	The material deals with the problems of water quality in settlements; the image shows water reservoirs. The problem itself is not shown.

Ex.10 (S44)	The guilty were fined 17 million tenges for violations on the rivers in Aktobe / problem-solution https://t.me/s/pressaktobe?before=433	Neutral (natural landscape with a reservoir and cargo vehicles)	The material deals with the problems of reservoirs and their surroundings, the problem is shown in close-up (deformed space near the river).
Ex.11 (S46)	'We need to save Shalkar and the lake right now!' / problem-solution https://timeskz.kz/61633-spasat-gorod-shalkar-i-ozero-nuzhno-uzhe-seychas.html	Negative (a desert dry landscape)	The material deals with the problems of reservoirs, which are critical environmental, recreational, and health-improving natural objects. The image shows a reservoir and its surrounding area.
Ex.12 (S48)	Akimat has not answered to scientists demanding to save the waters of Kokzhide / problem-problem https://timeskz.kz/60247-akimat-tak-i-ne-dal-otveta-uchenym-trebuyuschim-spasti-vody-kokzhide.html	Neutral (sand, trees)	The material deals with the problems of reservoirs, which are critical environmental, recreational, and health-improving natural objects. The reservoir itself is not shown in the image. The image is a sandy landscape outside of town.
	WASTE		
CODE	*74.ru* online media – https://74.ru		
Ex.13 (S8)	The paths in the Chelyabinsk forest will be covered with chopped brushwood after the 'Big Cleaning' / problem-solution https://www.1obl.ru/news/o-lyudyakh/v-chelyabinskom-boru-otsypyat-dorozhki-izmelchennym-valezhnikom-posle-aktsii-gen-uborka/	Positive (a person cleaning up natural waste)	The material deals with the problems of waste in the forested area of the city. The close-up image shows a person cleaning up the area.

Ex.14 (S10)	Natalya Kotova demanded that garbage bags be removed from the streets of Chelyabinsk / problem-solution https://www.1obl.ru/news/o-lyudyakh/natalya-kotova-potrebovala-ot-svoikh-zamov-vyvezti-meshki-s-musorom-s-ulits-chelyabinska/	Negative (garbage bags)	The material deals with the problems of garbage (waste) in settlements. A close-up shows the problem – black garbage bags.
Ex.15 (S12)	'Store in a bag for three days': Chelyabinsk residents were told how to properly dispose of medical masks / problem-solution https://www.1obl.ru/news/o-lyudyakh/khranit-v-pakete-tri-dnya-chelyabintsam-rasskazali-kak-pravilno-utilizirovat-meditsinskie-maski/	Negative (a thrown used mask)	The material deals with the problems of waste in cities (in particular, the problem of disposing single-use masks). A close-up shows the problem – a mask on the pavement.
Ex.16 (S32)	'People believed that I would succeed': the story of a schoolboy who fights against landfills alone / problem – solution https://nesorim.ru/lyudi-poverili-chto-u-menya-vsyo-poluchitsya-istoriya-shkolnika-kotoryiy-v-odinochku-boretsya-so-svalkami/	Positive (a child against the background of the forest)	The material deals with the problem of waste – positive content highlighting the involvement in solving the problem of waste. The image shows a forested area with the subject of the material – a young boy – in the center.
Ex.17 (S34)	Residents of the suburbs of Chelyabinsk sounded the alarm because of the plans to expand the landfill / problem-problem https://74.ru/text/ecology/2020/10/16/69507259/	Negative (a room with construction waste)	The material deals with the problems of landfills. The image shows the problem – piles of garbage.

Ex.18 (S36)	It was proposed to layout an arboretum at Chelyabinsk landfill. Let us show what is there now (you will be surprised) / problem-solution https://74.ru/text/ecology/2020/09/03/69454881/	Neutral (a natural landscape with cargo vehicles)	The material deals with the problems of landfills. The image shows the solution to the problem – reclamation of the landfill, namely, construction at the site of the landfill.
Aktobe Times newspaper – aktobetimes@list.ru			
Ex.19 (S62)	'Mercury poisons Aktobe'. Containers with hazardous waste did not undergo maintenance for a year and a half / problem-problem https://timeskz.kz/70305-rtut-otravlyaet-aktobe-poltora-goda-ne-obsluzhivalis-konteynery-s-opasnymi-othodami.html	Neutral (an iron orange container)	The material deals with the problems with the maintenance of hazardous waste containers. A close-up shows the source of the problem – a container of mercury.
Ex.20 (S64)	Tons of hazardous waste in Aktobe industrial zone continue to poison nature / problem-problem https://timeskz.kz/71689-tonny-opasnyh-othodov-v-promzone-aktobe-prodolzhayut-otravlyat-prirodu.html	Negative (a pile of waste in bags)	The material deals with the problems of landfills with hazardous toxic waste. A close-up demonstrates the source of the problem – a pile of waste bags.
Ex.21 (S66)	'Let's say no to waste!' A large-scale campaign to eliminate illegal dumping sites has started in Aktobe / problem-solution https://timeskz.kz/69171-skazhem-musoru-net-masshtabnaya-kompaniya-po-likvidacii-stihiynyh-svalok-planiruetsya-v-aktobe.html	Negative (a waste landfill)	The material deals with the problems of illegal dumping sites. The image shows the problem – an illegal dumping site, although the material itself covers a campaign to eliminate illegal dumping sites.

Ex.22 (S68)	The liquidation of illegal dumping sites has been delayed / problem-problem http://aktobetimes.kz/novosti/7781-likvidaciya-stihiynyh-svalok-zatyanulas.html	Neutral (operating equipment)	The material deals with illegal dumping sites. The image shows the solution to the problem – the disposal of illegal dumping sites, although the material itself covers the campaign to eliminate illegal dumping sites.
Ex.23 (S70)	The city needs a new landfill / problem-solution https://timeskz.kz/72295-gorodu-nuzhen-novyy-musornyy-poligon.html	Positive (a sprout)	The material deals with landfills. A close-up demonstrates the problem – a pile of household waste with a green sprout in the foreground.
Ex.24 (S72)	No new areas will be allocated for the solid waste landfill / problem – problem http://aktobetimes.kz/novosti/7791-dlya-poligona-tbo-ne-vydelyat-novyh-ploschadey.html	Neutral (operating equipment)	The material deals solid waste landfills. The problem is shown in the image – trucks with garbage (solid waste) are shown in front of landfills.
AIR			
74.ru online media – https://74.ru			

Ex.25 (S14)	Chelyabinsk enterprises almost doubled their investments in the environment / problem-solution https://www.1obl.ru/news/ekonomika/predpriyatiya-chelyabinskoy-oblasti-pochti-v-dva-raza-uvelichili-investitsii-v-ekologiyu-/	Negative (smoking plant pipes)	The material deals with the problems of air. Although the headline conveys positive news – reducing emissions, the image demonstrates the problem – close-ups of smoking pipes. The photo is processed with color filters.
Ex.26 (S16)	Smoke from forest fires is observed in Chelyabinsk region / problem-problem https://www.1obl.ru/news/o-lyudyakh/v-chelyabinskoy-oblasti-nablyudaetsya-zadymlenie-ot-lesnykh-pozharov/	Neutral (an urban landscape)	The material deals with the problems of air. The general plan (plan view) shows a smoky city caused by forest fires.
Ex.27 (S18)	'Overheated and spoiled': experts covered up for the environmental reputation of Chelyabinsk region / problem-solution https://www.1obl.ru/news/o-lyudyakh/peregretaya-i-isporchennaya-eksperty-zastupilis-za-ekologicheskuyu-reputatsiyu-chelyabinskoy-oblasti/	Negative (a smoky country landscape)	The material deals with the problems of air in the region and the environmental reputation of the region. The image shows the problem – the countryside with smoking pipes in the background.
Ex.28 (S20)	A radiation fog was formed in Chelyabinsk for several days. Let us look at the photos making our eyes welling up with tears / problem-emotion https://74.ru/text/ecology/2020/12/02/69594391/	Negative (a smoky urban landscape)	The material deals with the problems of air in the city. The image shows the problem – the urban landscape shrouded in fog, with pipes actively smoking on the horizon.

Ex.29 (S22)	The Federal Service for Hydrometeorology and Environmental Monitoring announced that the air in Magnitogorsk has become cleaner. What is the situation in Chelyabinsk? / problem-solution https://74.ru/text/ecology/2021/03/19/69820565/	Negative (a smoky urban landscape)	The material deals with the problems of air in the city. The image shows the problem – the urban landscape shrouded in fog, with pipes actively smoking on the horizon.
Ex.30 (S24)	Texler told when Chelyabinsk will stop choking with emissions / problem-solution https://74.ru/text/ecology/2020/12/23/69651076/	Negative (a choky urban landscape)	The material deals with the problems of air in the city. The image shows the problem – the urban landscape shrouded in fog, with pipes actively smoking on the horizon.
Aktobe Times newspaper – aktobetimes@list.ru			
Ex.31 (S50)	'We're not the only ones belching smoke'. This is how Aksu Ferroalloys Plant management comments on the problem of air pollution in Aktobe / problem-problem https://timeskz.kz/78221-dymim-ne-tolko-my-tak-rukovodstvo-azf-kommentiruet-problemu-zagryazneniya-vozduha-v-aktobe.html	Neutral (a country landscape)	The material deals with the problems of air in the region. A close-up shows a cargo vehicle against the backdrop of a country landscape, with smoking pipes in the background.
Ex.32 (S52)	Citizens were poisoned with hydrogen sulfide 59 times a week / problem-emotion https://timeskz.kz/70612-59-raz-za-nedelyu-gorozhan-travili-serovodorodom.html	Neutral (person in a mask)	The material deals with the problems of air in the city. The medium plan depicts the city demonstrating the problem – air pollution of the urban environment, with the central object in the foreground (a woman in a mask).

Ex.33 (S54)	When will the stench leave Aktobe? / problem-emotion https://timeskz.kz/77800-parlament-moldavii-ukrepil-prava-russkoyazychnogo-naseleniya-prinyav-rezonansnye-zakony.html	Negative (smoke, a person covering the face)	The material deals with the problems of air in the city. The close-up view demonstrates the problem of polluted air, namely, a woman covering her face with a handkerchief against a background of smoke.
Ex.34 (S56)	The main source of the stench in Aktobe will be eliminated next year / problem-solution https://arnap.kz/article/5f352fedb3fdb40560c0a4c7	Negative (smoke, a person in a gas mask)	The material deals with the problems of air in the city. The close-up view demonstrates the problem of polluted air, namely, a man in a gas mask on the right, against the backdrop of a smoky landscape.
Ex.35 (S58)	Clean air in Aktobe is delayed by years / problem-problem https://timeskz.kz/72533-chistyy-vozduh-v-aktobe-otkladyvaetsya-na-gody.html	Negative (a person in a protective suit and a gas mask)	The material deals with the problems of air in the city. The close-up view demonstrates the problem of polluted air, namely, a man in a gas mask against a smoky landscape, with a clean country landscape with blue skies and green grass on the right (in contrast).

Ex.36 (S60)	What was saving the city from the stench before, and why it is not done now / problem-problem https://timeskz.kz/70870-chto-spasalo-gorod-ot-zlovoniya-ranshe-i-pochemu-etogo-ne-delayut-seychas.html	Negative (smoke, a person in a gas mask)	The material deals with the problems of air in the city. A close-up view demonstrates the problem of polluted air, namely, a man in a gas mask in the center, against a smoky landscape.

After the eye-tracking study, we obtained data on the eye movements and fixations of each study participant with heat maps demonstrating the most fixated zones in the above-specified areas of interest. The data was exported to a software suite for analysis. In this case, we calculated the time of complete fixation, the number of fixations, and the average fixation duration for each stimulus on the headline, text, and image.

We conducted a survey among participants immediately after the eye-tracking study. The survey included three closed-ended questions for each stimulus. The first question was aimed at studying the degree of attention to particular elements of the presented stimulus. The second question was aimed at identifying the emotional response to the presented stimuli. The third question determined the participant's desire to undertake actions in response to the presented information (stimuli). The goal of the main group of questions was to identify the most significant aspects (elements) of the viewed materials – the attractiveness of the text, images, and understanding of the content, which represented the cognitive and affective levels. The survey also included a block responsible for the analysis of the behavioral level, expressed in responses related to the desire/unwillingness to display a certain activity.

Results

Eye-tracking study results

We compared the total fixation time by the areas of interest, namely the fixation time on the text area and the image area. We estimated both the time of fixation on the stimulus in general (total) and on its separate areas. All the stimulus examples have a text area and an image area. According to the eye-tracking study, the total fixation time was significantly longer on the text areas (*Figure 2*).

Figure 2

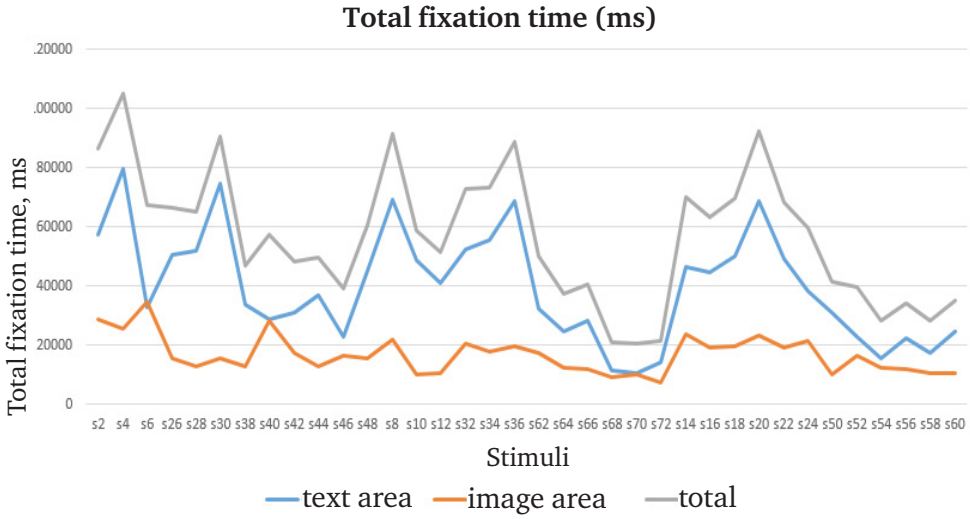


Table 5

Distribution of the stimuli by topics and regions

Water		Waste		Air	
Chelyabinsk	Kazakhstan	Chelyabinsk	Kazakhstan	Chelyabinsk	Kazakhstan
s2, s4, s6, s26, s28, s30	s38, s40, s42, s44, s46, s48	s8, s10, s12, s32, s34, s36	s62, s64, s66, s68, s70, s72	s14, s16, s18, s20, s22, s24	s50, s52, s54, s56, s58, s60

We see that the largest number of fixations was on the text area. We can use statistical methods to extrapolate the obtained data to other similar environmental materials covering water, air, and waste issues. An analysis of the respondents' reactions to the stimuli allowed us to highlight the most attractive stimuli in terms of the fixation time on the text and image areas. There were also stimuli which showed top results for both text and image areas. We took into account the topic of each stimulus when summing up the analysis of the eye-tracking study (*Table 6*).

Table 6

Areas of interest with the longest fixation (top three)

Category	Topic	Text area / ms			Image area / ms		
		Air	Water	Waste	Air	Water	Waste
Problem – problem		**31079 ms** 'We're not the only ones belching smoke'. This is how Aksu Ferroalloys Plant manage ment commented on air pollution in Aktobe / problem – problem – stimulus 31 (S 50)	**79758 ms** 'How long does Fershampenuaz have to live without treatment facilities?' / problem –problem – stimulus 2 (S4)	**55395 ms** 'Residents of the suburbs of Chelya-binsk sounded the alarm because of the plans to expand the landfill' / problem – problem – stimulus 17 (S 34)	**19051 ms** 'There is smoke from forest fires in the Chelya binsk region'/ problem – problem – stimulus 26 (S 16)	**28447 ms** 'A local environmental disaster is becoming imminent in the Aktobe region' / problem –problem – stimulus 8 (S40)	**18018 ms** 'Residents of the suburbs of Chelya-binsk sounded the alarm because of the plans to expand the landfill' / problem – problem – stimulus 17 (S 34)

Problem–solution	**49204 ms** 'The Federal Service for Hydrome-teorology and Environ-mental Monitoring announced that the air in Magnito-gorsk has become cleaner. What is the situation in Chelya-binsk?' / problem – solution – stimulus 29 (S 22)	**74699 ms** 'The person in charge of the state of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake' / problem – solution – stimulus 6 (S30)	**68908 ms** 'Arbore-tum proposed at Chelya-binsk landfill. Let us show what is there now (you'll be surprised)' / problem – solution – stimulus 18 (S 36)	**23583 ms** 'Chelya-binsk enterprises almost doubled their environ-mental invest-ments' / problem – solution – stimulus 25 (S14)	**34620 ms** A contractor was chosen to clean up the Miass River in Chelya-binsk' / problem-solution – stimulus 3 (S6)	**21874 ms** 'Paths in the Chelya-binsk forest will be covered with chopped brushwood after the Big Cleaning project' / problem – solution – stimulus 13 (S8)
					28972 ms 'Drilling of a new well began in the village of Shumaki, Korkinsky district, after mercury was discovered in the water' / problem – solution – stimulus 1 (S2)	

Problem–emotion	**68693 ms** 'Radiation fog formed in Chelya-binsk for several days. Let's look at the photos which made our eyes well up with tears' / problem –emotion – stimulus 28 (S20)	**52021 ms** 'Fish in the Miass River in Chelya-binsk may have died due to a sewer leak' / problem – emotion – stimulus 5 (S 28)	The topic is not covered in this category.	**23472 ms** 'Radiation fog formed in Chelya-binsk for several days. Let's look at the photos which made our eyes well up with tears' / problem – emotion – stimulus 28 (S20)	**13012 ms** 'Fish in the Miass River in Chelyabinsk may have died due to a sewer leak' / problem – emotion – stimulus 5 (S28)	The topic is not covered in this category

According to the results of the eye-tracking study, the evident leader in fixation time on the text area was Stimulus 2 (79.758 milliseconds (ms)), entitled 'How long does Fershampenuaz have to live without treatment facilities?' The article dealt with the problem of water quality in settlements; maximum fixation time was on place name Fershampenuaz.

Notably, this stimulus is also among the leaders (top three) in terms of the fixation time on the image area and has the highest rates by the total fixation time (total) – 105301 ms. This is displayed in the heat map of the stimulus (*Figure 3*). Example 6 showed the second longest fixation time on the text area (74699 ms). The article 'The person responsible for the state of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake' discussed reservoir inspection activities and further dismissal of the leading official. However, in terms of fixation time on the image area and the total fixation time (total), it ranked roughly in the middle, as displayed in the heat map (*Figure 4)*.

Figure 3

Heat map of stimulus 2

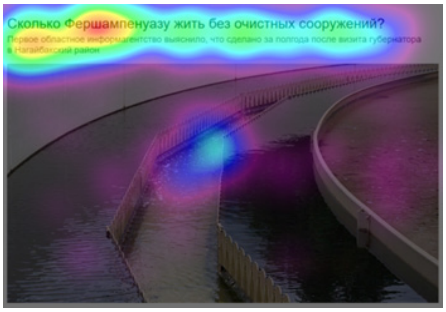


Figure 4

Heat map of stimulus 6

The next highest results in fixation time on the text area were shown by Stimulus 28 (68693 ms) – 'Radiation fog formed in Chelyabinsk for several days. Let's look at the photos which made our eyes well up with tears'. The maximum fixation time was on the phrase 'radiation fog'. At the same time, this stimulus also showed some of the strongest results in fixation time on the image and in total fixation time (total) – 92165 ms, which is also shown by the heat map of this stimulus (*Figure 5*).

Figure 5

Heat map of stimulus 28

We can conclude that examples 2, 6, and 28 related to water and air problems attracted the maximum attention of this particular group of respondents. At the same time, the graphics were a semantic continuation of the text. To analyze the results of the eye-tracking study, we chose the six stimuli with the longest fixation time (*Table 5*). Apart from the top-three best performing stimuli, examples 25 and 18 also demonstrated long fixation time for the text area (69399 ms and 68908 ms, respectively). These materials dealt with combating emissions and waste collection in settlements and landfill reclamation.

The best results in fixation time on the image was recorded for Stimulus 3 (34620 ms), which depicts a river and a cleaning machine, i.e., the cleaning of the reservoir (*Figure 6*). The next best results in fixation time were shown by Stimulus 1 (28972 ms), which shows a bird drinking water (Figure 7). Stimulus 8 (28447 ms), which has similar indicators, also deals with the problems of water purity (*Figure 8*). The figures below show the heat maps of these stimuli, the images of which had the longest fixations.

Figure 6

Heat map of stimulus 3

Figure 7

Heat map of stimulus 1

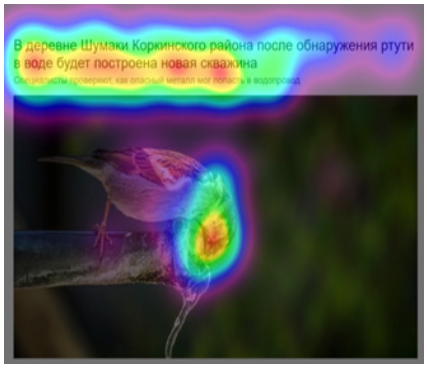
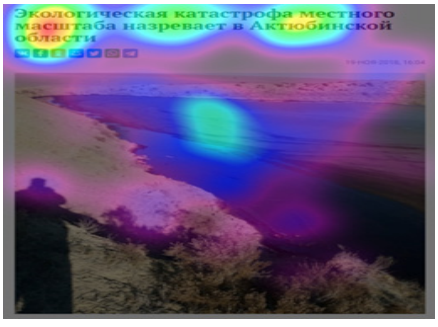


Figure 8

Heat map of stimulus 8



Stimulus 25, which discusses air pollution and shows smoking pipes, also showed some of the best results in fixation time. There is a group of stimuli, which demonstrates a low number of fixations both in terms of the individual elements (text and image) and overall. Stimulus 24 (problem-problem) is a good example of this, having low level of image fixation time (7433 ms). Stimulus 24 is dedicated to waste problems and shows trucks with garbage (solid waste) in front of a landfill. This stimulus also had some of the lowest numbers of fixations on the text. Stimulus 23 (problem-solution) also had a low number of fixations on the text (10621 ms). It also deals with waste problems, landfills in particular, showing a closer image of the issue – a pile of household waste with a green sprout in the foreground. The image of this stimulus also had low fixation times. Based on a qualitative analysis of recorded fixation times, we determined which area of interest, category, and topic had the best results. The longest fixation times were recorded for the text areas; the problem-solution category; and the topic of water, respectively. The topics of air and water had greater fixation times than waste. The lowest fixation times were recorded for stimuli discussing waste issues in the problem-problem and problem-solution categories.

Results

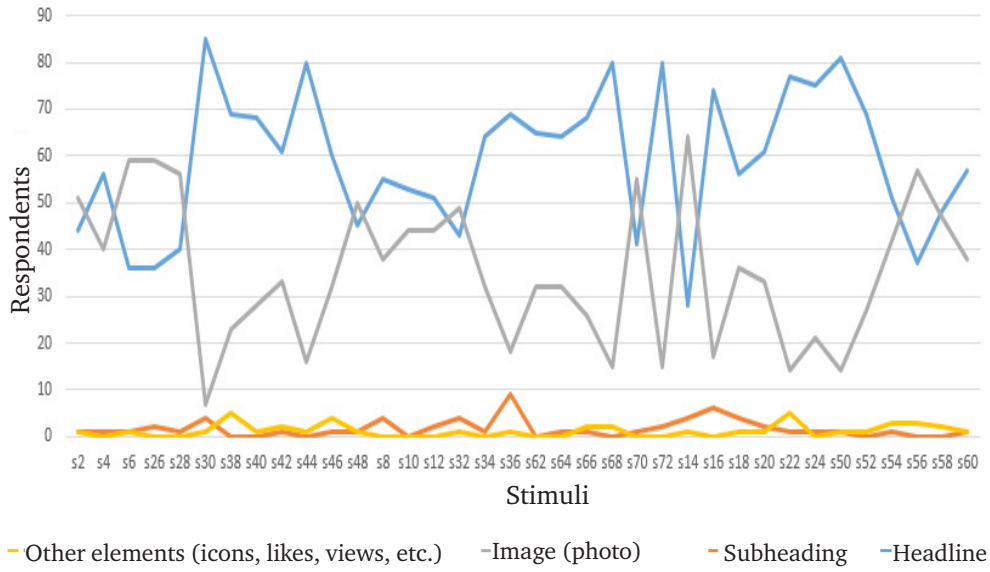
Immediately following the eye-tracking procedure, students were asked to answer questions on their perception of the viewed content to identify their retention and evaluation of the presented material. When creating the survey, we referred to the population's environmental behavior in the region. The questions can be conditionally divided into three blocks; the first block has a cognitive component and is aimed at identifying primary and secondary elements of the media text in the perception of information. The second block of questions defines the affective component through emotional assessment of the object and the response of the subject to the proposed stimulus material. The third block of questions has a conative component and is aimed at identifying behavioral attitudes and the respondents' readiness to undertake certain actions as a response to environmental material.

The first block of questions identified the participants' attention to the structural elements of the presented stimulus. Participants were asked to determine what they primarily paid attention to when looking at the stimulus material: headline, subheading, image (photo), other elements (icons, likes, views, diagrams, graphs, etc.). The stimulus material had a complete and clear composition. Visual hierarchy, which is related to the ratio of the text and image, is important in the layout of the content. Most of the respondents answered

that the headline attracted their attention primarily. This was confirmed by the results of the eye-tracking study. The participants paid little attention to details (icons, likes, comments, etc.) in the structural composition. This was confirmed by the survey data and the results of the eye-tracking study, as seen in the graphs (*Figure 9*).

Figure 9

Areas of attention identified by participants



The obtained data correlate well with other studies indicating that information is processed 'top-down'. The headlines which attracted the most attention include: 'The person in charge of the condition of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake' (S30 – stimulus 6; 80% of the respondents); 'No new areas will be allocated for the solid waste landfill', 'Removal of illegal dump sites dragged on' (S72 – stimulus 24 and S68 – stimulus 22; 78% of respondents); 'The guilty were fined 17 million tenges for violations on the rivers in Aktobe' (S44 – stimulus 10; 78% of the respondents).

Most of the headlines that attracted the subjects' attention are in the problem-solution category and use a behavioral approach and/or calls to action; this may be explained by the fact that visual information is processed faster than textual information. We should also take into account the factor of familiarity: smoking pipes and landfills are the most common photos in the regional mass media.

The goal of the second block of questions was to establish the participants' emotional reactions to the presented materials on a scale (negative to positive). Emotional responses are short-term and have a different degree of manifestation based on the stimulus (in this case, environmental issues presented in the media). In this block, we aimed to determine the participants' immediate, general evaluation of the stimuli on a scale.

The subjects were offered the following scale of emotions: fear, anxiety, excitement, hostility, disinterest, indifference, hope, and tranquility.

Fear, as the strongest emotion, is considered negative and connected with an internal feeling of impeding or perceived threat. This emotion was mainly indicated to mark the strongest negative emotion and identify less strong but also negatively colored emotions against its background. The next suggested negative emotion was anxiety. The concepts of fear and anxiety are not synonymous, but can be used interchangeably when it comes to situational anxiety and feeling unsafe. The next suggested emotion was excitement. Excitement is an expectation that something will happen or might happen. It can be both pleasant and disturbing. According to the survey of the students, anxiety was the most common scale of negative emotions. Participants indicated anxiety on the emotional scale in response to the following stimuli: 'Smoking from forest fires is observed in the Chelyabinsk region' (showing a birds eye view of a smoky city) (S16 – stimulus 26; 47% of the respondents); 'Fish in the Miass River in Chelyabinsk may have died due to a sewer break' (showing a close-up of dead fish in the river) (S28 – stimulus 5; 32% of the respondents); 'Tons of hazardous waste in the industrial zone of Aktobe continue to poison nature' (showing a close-up image of trash bags) (S64 – stimulus 20;31% of the respondents). The headlines and images show possible and existing threats to health and safety.

The neutral emotions on the scale, such as disinterest and indifference, are connected with a lack of emotions to the proposed stimuli. Indifference was one of the most common emotions expressed in the respondents' answers.

The following materials evoked a neutral response in the majority of the respondents: 'Store in a bag for three days: Chelyabinsk residents were told how to properly dispose of medical masks' (showing a close-up of a used, thrown away mask) (S12 – stimulus 15; 37% of respondents); 'Texler told when Chelyabinsk will stop choking with emissions' (showing a close-up of a smoky urban landscape) (S24 – stimulus 30; 49% of respondents); 'Akbulak is afraid of the consequences of wastewater treatment at Aksu Ferroalloys Plant' (showing water storage and treatment equipment) (S42 – stimulus 9; 30% of

respondents). This emotion is usually associated with the neutral connotation of eco-materials. The positive end of the emotional scale includes such emotions as hope and tranquility. Hope is opposed to fear, anxiety, and excitement, and is related to inspiration and expecting changes for the better.

Tranquility is associated with peace and harmony, and the absence of external irritants. Several stimulus materials inspire hope, including the undisputed leaders: 'People believed that I would succeed': the story of a schoolboy who struggles with landfills alone' (showing a child in front of a forest) (S32 – stimulus 16; 57% of the respondents); 'We cannot see the banks: unexpected paths to the Miass River will be cleaned in Chelyabinsk' (showing a polluted area near the river) (S26 – stimulus 4; 52% of respondents); 'The person in charge of the state of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake' (showing authorities inspecting the site) (S30 – stimulus 6; 30% of respondents). Headlines and images with a positive or neutral connotation offer hope.

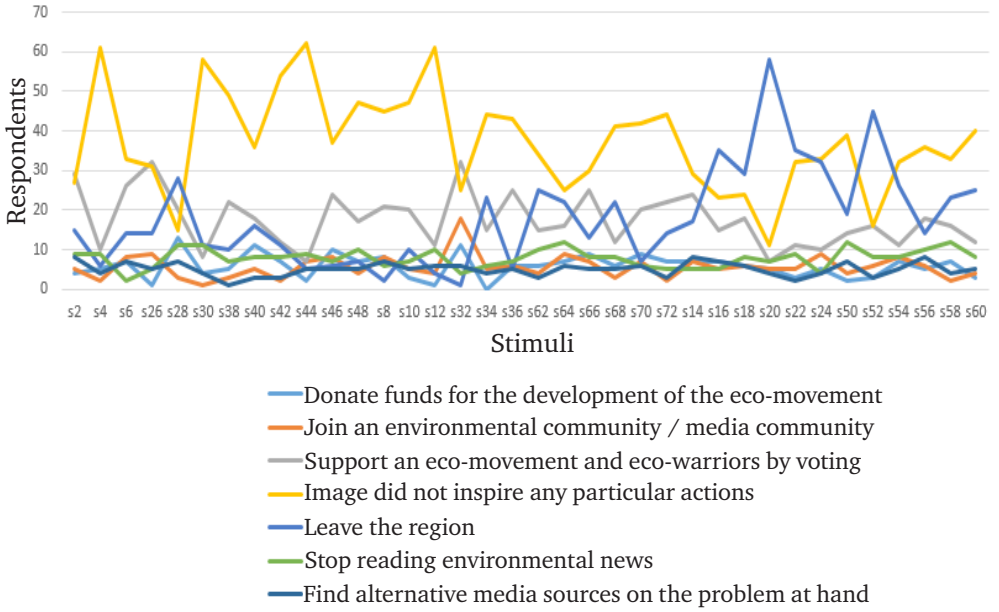
When evaluating the emotional scale of perceiving environmental information, we should note the diverse palette of emotions from negative (anxiety), neutral (indifference), to positive (hope). First of all, we should take into account a certain connotation of the headline and image.

The third block of questions was related to the subjects' behavioral attitudes, the purpose of which was to find out if the environmental texts and images affect the subjects' desire to take action. The proposed variants of behavioral attitudes reflected a diverse range of behavior regarding environmental issues, from active participation to lack thereof.

The range of behavioral attitudes offered in the last block of the survey reflected different reactions to the stimulus material. Most of the subjects showed indifference in their answers–the viewed stimulus material did not lead to a desire to do anything (which is clearly demonstrated by the graphs in *Figure 10*).

Figure 10

Behavioral attitudes demonstrated as a response to the stimulus material



The following stimulus materials were the leaders in the survey:

1. Leader among the headlines: stimulus 6 (S30) 'The person in charge of the state of Turgoyak was asked to resign after the Minister of Ecology arrived at the lake'

2. Leader on the emotional scale:

a) anxiety – stimulus 26 (S16) 'Smoke from forest fires is observed in Chelyabinsk region';

b) indifference – stimulus 30 (S24) 'Texler stated when Chelyabinsk will stop choking with emissions';

c) hope – stimulus 16 (S32) 'People believed that I could do it: the story of a schoolboy who fights against landfills alone'. The survey data coincide with the results of the eye-tracking study.

The survey data coincide with the results of the eye-tracking study.

Content analysis results

We studied the accounts of Chelyabinsk Internet media which publish information on environmental studies (*74.ru* and *First Regional TV Channel* of the Chelyabinsk Region – *1obl.ru*). In particular, we investigated ecotexts as a cognitive-affective stimulus forming responses and behaviors among readers.

We began our structural content analysis by selecting ecotexts from *74.ru* and *1obl.ru*. We studied all publications for 2019–2021. Over 200 informational materials were identified in this initial step. Next, we applied simple random selection to this initial batch of materials. Analysis of these materials allowed us to identify regularities and features of how environmental information is presented in these Internet resources.

Next, we analyzed the desired impact of the information materials on the audience. We based our analysis on the theoretical concepts and prerequisites of the theories of mass communications, which we presented earlier in this paper. We found that all the information resources have three areas of influence: 1) they form knowledge, 2) they encourage action, 3) they evoke reflection in the form of emotional responses to the information received.

Next, we carried out a quantitative analysis of the frequency at which environmental issues were mentioned in the materials of the studied Internet resources. We found that information in the problem-emotion and problem-problem categories prevails on *74.ru* website; there was nearly twice as much material in the problem-emotion category than on *1obl.ru*. Problem-solution is more often associated with the topic of air and waste than with water. On *1obl.ru*, problem-emotion was the most frequent category; this category of texts was mostly neutral.

The next stage of the content analysis was the study of the stylistic focus of the ecotexts, which aimed to familiarize the readership with environmental issues. We examined the overall tone and connotation of the ecotexts presented to the audience (*Table 7*).

Table 7

Connotations of the environmental content

Category	Media resource	Air			Water			Waste		
	Content connotations	(-)	(0)	(+)	(-)	(0)	(+)	(-)	(0)	(+)
Problem-problem	*74.ru*									
	OTV/ 1obl.ru									
Problem-solution	*74.ru*									
	OTV/ 1obl.ru									
Problem-emotion	*74.ru*									
	OTV/ 1obl.ru									

Notably, the materials on *.ru* in the problem-problem category, which deal with the topics of air and water, had a predominately negative connotation; the material is expressive and accusatory, there are references to expert opinion confirming the depth and systemic nature of the problem, which requires immediate solution.

On *1obl.ru*, the materials in the problem-problem category dealing with air and water have mostly neutral connotation. The materials provide factual information reflecting real events and measures taken on the identified problems. The topic of waste is reflected in a positive light; *1obl.ru* covers the possibilities of solving the problem and explores the options and methods to avoid the problem and its consequences.

Materials in the problem-solution category from *74.ru* on the topic of air and waste have a negative connotation; the materials include information on the authorities' failure to act and insufficient measures to solve pressing environmental problems. The topic of water is presented in a neutral connotation; *74.ru* presents information on events that have already taken place, reflecting measures taken by citizens and authorities to solve the unfavorable environmental situation.

On *1obl.ru*, the materials discussing water quality are neutral in the problem-solution category, establishing specific facts and events on attempts to solve existing issues. The issues of air and waste are presented in a positive light and the materials provide information on the prospects and opportunities for solving current problems preventing them in the future. The texts are presented as an appeal or address to the public with calls to participate in the existing events and projects.

On *74.ru*, texts on all of the environmental topics were marked by a negative connotation in the problem-emotion category, with a predominance of rhetorical questions about the future of the region, including stylistically reduced vocabulary and exclamatory-interrogative sentences in the headlines. On *1obl.ru*, texts in the problem-emotion category present the entire range of environmental issues in neutral and positive aspects; positive connotation prevails, reflecting significant achievements in solving environmental problems.

In general, the overall style of the content from *74.ru* dealing with the environmental problems of the region has a more negative and emotional nature; the website focuses on pressure points and the uncertainty of the response to the problem in the distant future. The overall style of the content on *1obl.ru* has a generally more productive nature of information materials focusing on achievements, opportunities, and specific prospects of solving environmental problems.

Our analysis showed that when creating and forming ecotexts, headlines, and lead paragraphs, *74.ru* frequently use parts of speech typical of a stylistically reduced vocabulary with pejorative and negative connotations (*Table 8*).

Table 8

Words from headlines and main text of materials from *74.ru* and *1obl.ru* with a negative connotation

Parts of speech	Examples of words in headlines
Noun	Stuffiness, stench, stink, smog, mercury, fires, shortage, catastrophe, problem, fetor, liquidation, industrial area
Adjective	Dead, radiative, disturbed, guilty, polluted, dangerous
Verb	Suffocate, dispose of, shed tears, fight, think, be afraid of, escape, poisoned, leave
Adverb	Unexpectedly, alone, arduous, difficult

Word forms derived from the verb 'to poison' are most frequently used in headlines. Semantic variations of these word forms are found in almost every second headline: poison, poisoned, being poisoned, got poisoned, poisonous, etc.

The structural content analysis showed that online media uses all variations of text manipulations in environmental texts: terms, symbols, images, facts, events, names, place names, public organizations, etc.

Conclusions

Our pilot study of environmental materials and their influence on young people's perception confirmed our hypotheses. Our first hypothesis was that headlines attract the most attention of the youth audience rather than the accompanying images. This was confirmed by using eye-tracking equipment, survey, and content analysis. We revealed that the text attracted more attention than the image; specific headlines, including complex place names and words with a negative connotation, attracted special attention in particular. In some cases, the images also attracted a great deal of attention; the respondents actively reacted to the images of living objects and images with pronounced environmental problems.

In the eye-tracking study there were stimuli with the same fixation time on both image and text – Stimulus 3 (S6) – a person in a river skimmer; Stimulus 8 (S40) – a human shadow in front of a reservoir; Stimulus 23 (S70) – a plant

in front of a pile of garbage. The text areas in the same stimuli (Stimuli 3, 8, 23) demonstrated the lowest level of fixation time. These stimuli had single-line headlines carrying information which is neutral for the respondents. The materials which showed the longest fixation time during eye-tracking showed leading results both in the text area and in the image area, where the text and the image are in harmony and complement each other. This also confirms the second hypothesis to some extent.

Our second hypothesis was that the symbiosis of the headline and the image can cause both positive and negative emotions on environmental problems, to a greater extent forming an indifferent or sharply negative attitude towards the information received. This was confirmed by the results of the survey and the content analysis. The survey allowed us to confirm that media pressure has unpredictable effects, which manifest in the audience's social interaction. The conative-behavioral component showed low motivational activity and unwillingness to get involved in solving environmental problems. Environmental materials cause cognitive dissonance and negatively affect the social well-being of society, which has an extremely undesirable effect on the image of the region.

Our third hypothesis was that excessive media pressure on environmental issues generates negative emotions and leads a destructive perception of the objective reality of the environment and the ecological situation among youth readership. This was also confirmed. We see that lexical expression created by words with reduced stylistic coloring and the semantic dominant of 'environmental threat' creates a negative impression and forms a stereotypical perception of the ecotext. The media dictate the situation to increase their ratings while moving away from objective information. Within our content analysis, we established that the headlines attract the greatest deal of attention they follow certain standard patterns of composition and are always present in such materials. Attention is drawn to the images with complex or unfamiliar (atypical for an average person) objects. Rather than motivate the readership to take action, most of the stimuli unfortunately contribute to desires to 'leave the region' or 'disregard solving environmental problems'.

Thus, media coverage of environmental issues in the regions of environmental risk zones revealed excessive pressure on the youth audience. At the same time, the analyzed information materials do not increase the social responsibility and self-awareness of young people, but rather cause an indifferent attitude. Headlines also exert pressure; however, they do not achieve the initial goal of encouraging young people to actively respond to environmental issues, but rather create indifference and a negative response.

References

ADULOJU, E. T. (2020). Undergraduate students and time spent on social networking sites: A study of the University of Port Harcourt, Nigeria. *World of Media. Journal of Russian Media and Journalism Studies*, 3: 57–72. DOI: 10.30547/WORLDOFMEDIA.3.2020.3

ALLAN, S., ADAM, B., & CARTER, K. (2000). Environmental risks and the media. Psychology Press.

ARTEMYEVA, V. (2021). What is iTracking, or how museums study their visitors. Available from: https://yandex.ru/turbo/novayagazeta.ru/s/articles/2020/05/22/85491-smotri-mne-v-glaza (accessed 22.08.2021).

CHEN, D., (2015). *Social media in solving current socio-political problems: Ph. D. in political science: 10.01.10.* St. Petersburg.

CHVYAGINA, T. (2017). Ecological vocabulary of the Russian language. *Vestnik VSU. Series: Philology. Journalism*, 2.

DIMOCK, M. (2019). Defining generations: Where millennials end and generation Z begins. *Pew Research Center*, 17(3).

Ecology of human being: Information and introductory dictionary (2020). Edited by Neveleva, S. et al. Chelyabinsk: *SUSU Publishing Center*, p.187.

ETHERINGTON, D. (2020). 'The eye tribe begins pre-orders for $99 eye tracking developer device for Windows PCs' TechCrunch. Available from: https://techcrunch.com/2013/09/05/the-eye-tribe-starts-pre-orders-for-99-eye-tracking-developer-device-for-windows-pcs/.

FESTINGER, L. (1957). Cognitive dissonance theory. Stanford University Press, p. 87.

GRIBOK, N., & TIKUNOV, V. (2015). The natural-environmental component of Russia's image in mass media (case study of the RIA 'Novosti' agency). *Bulletin of Moscow University. Series* , 5, pp. 17–23.

GUREEVA, A., SAMORODOVA, E., & KUZNETSOVA, V. (2020). Media communication activities of Russian universities: Dynamics of the development and evaluation of social network efficiency. *World of Media. Journal of Russian Media and Journalism Studies*, 1, pp. 30–49. DOI: 10.30547/worldofmedia.1.2020.2

GUREEVA, A., DUNAS, D., & MURONETS, O. (2021). Government and youth communications in social media: Theoretical basics and Russian practice. *World of Media. Journal of Russian Media and Journalism Studies*, 1. DOI: 10.30547/worldofmedia.1.2021.2

HABERMANS, J. (1981). Theorie des kommunikativen Handelns. Boston: Beacon Press, p. 18.

IVANOVA, E. (2021). Ecolinguistics and the role of a metaphor in describing environmental problems. Available from: https://cyberleninka.ru/article/n/ekolingvistika-i-rol-metafory-pri-opisanii-ekologicheskih-problem/viewer.

IVANOVA, L. (2019). Environmental culture in Russian society as a condition for building eco-consciousness and behavior of the younger generation. *Economic and social changes: facts, trends, forecast,* 12(1), pp. 189–197.

KALININA, N. (2016). Environmental journalism in the modern media sphere. *The Bulletin of Amur State University*, 72, pp.16–21.

KALININA, N. (2019). Genesis of environmental press in Russian media system at the turn of the 1980–1990s. T*he Bulletin of Amur State University*, 86, pp. 26–31.

KALINKIN, A. (2019). The interview with the general producer of Realist web Fest concerning the current trends, changing market and the future of media content. Available from: https: http://www.kinometro.ru/interview/show/name/Kalinkin_interview_8894.

KOLESOVA, E. (2016). Modern methods of environmental education: Some approaches. In: *The Earth Charter – a practical tool for solving fundamental problems of sustainable development: Collection of proceedings of the international scientific conference devoted to the 15th anniversary of the implementation of the Earth Charter principles in the Republic of Tatarstan*, pp. 454–456.

LEUNG, L. (2004). Net-generation attributes and seductive properties of the internet as predictors of online activities and internet addiction. *CyberPsychology & Behavior*, 7(3), 333–348.

LIPPMANN, W. (1916). What program shall the United States stand for in international relations? *Annals of the American Academy of Political and Social Science*, 66, pp. 60–70.

MALETZKE, G. (1963). *Psychologie der Massen Kommunikation,* p. 121.

MICHEL, K. D. (2012). Understanding differences in audience engagement and response: applying a composite model to avatar perception. *Communication Review*, 15.

NPR. (2012). *Assistive technology blog: The eye tribe: Eye tracking in tablets.* Assistive technology blog. Available from: http://www.assistivetechnologyblog.com/2012/12/the-eye-tribe-eye tracker-in-tablets.html.

ORANGE, E., & COHEN, A. M. (2010). From eco-friendly to eco-intelligent. *The Futurist*, 44(5).

PEROVA, A. (2017). The role of mass media in the coverage of 'new' environmental disasters: Narratives and risks. *Communicology,* 5(5).

SHARKOVA, E. (2014). Environmental journalism: the nature of sources of environmental information. *Apriori. Series: Humanities*, 2.

SIMAKOVA, S. (2015). Tendencies of journalistic content visualization in modern media. *Bulletin of Khetagurov North Ossetian State University*, 3.

SVITICH, A. (2015). Specificity of graphic illustration as a component of the content of quality publications. *Mediaskop*, 3.

TORELLI, R., BALLUCHI, F., & LAZZINI, A. (2020). Greenwashing and environmental communication: Effects on stakeholders' perceptions. *Business Strategy and the Environment*, 29(2).

VORONOVA, V. (2011). Ecotext as the object of lexical stylistic analysis. *Lingua mobilis,* 2 (28), pp. 70–73.

WILLIAMS, K.C. (2011). Marketing to the generations. *Journal of Behavioral Studies in Business*, 3(1), pp. 37–53.

YAROSH, O. (2019). Visual neuromarketing: Research methodology and tools. *Scientific Notes of Vernadsky Crimean Federal University. Biology. Chemistry*, 71(4), pp. 233–247.

YESINA, E. (2015). Environmental issues in the modern media and the prospects for their development in the environmental aspect. *Bulletin of Environmental Education in Russia*, 4, pp. 14–18.