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Algorithmisation of the Means of Representing the “New Knowledge” Frame in Popular Science Discourse

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The paper outlines research identifying key elements of the ‘new knowledge’ frame in popular science Telegram channels. Highlighting categories that can be used to describe this frame, authors propose principles for developing an algorithm to search for it. The article demonstrates that the terminals’ automatic recognition of the frame ‘new knowledge’ is accomplished by developing a multistage search algorithm that involves describing programmed units located within the different-level linguistic means, creating a qualitative sample, and drawing conclusions about the inclusion of the category in the algorithm’s requirements. The paper employs both quantitative and qualitative methods to identify trends in various types of media to make some basis for further development of a supervised ML system. An analysis of 288 units from popular science Telegram channels reveals that the location and frequency of framing techniques in texts indicate the quality and level of audience preparation. The results of the study have demonstrated that the term ‘new knowledge’ is explicated via the set of semantics components that form the following microfields: a) The course of study; b) The result of study; c) The subject of research work; d) Comparison between new knowledge and old knowledge; e) Novelty of knowledge; f) Denial of previous knowledge. The aim of the frame description is to develop an algorithm that can identify units within this frame in real speech materials of social media. This will aid future research on objection’s stylistics and enable the development of AI systems that can be trained to recognize objection styles.

Keywords: framing, computational linguistics, popular science discourse, automatic text analysis, objection

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Научная статья

Алгоритмизирование средств представления фрейма «новое знание» в научно-популярном дискурсе

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Работа представляет собой исследование поискового характера, выявляющее терминалы узлового фрейма «новое знание» в научно-популярных телеграм-каналах. На данном этапе авторы предлагают принципы, на которых будет разрабатываться алгоритм поиска обозначенного фрейма в тексте научно-популярных медиа, и делают упор на признаки, которые могут описать этот фрейм. Посредством синтеза исследовательских методов в статье выявляется, что автоматическое распознавание признаков фрейма «новое знание» обеспечивается многоступенчатой разработкой алгоритма поиска: задаётся описание программируемых единиц в составе разноуровневых языковых средств, присутствующих в тексте научно-популярного медиа; создаётся качественная выборка; на её основе делаются выводы о включении категории в требования к алгоритму. Количественные и качественные методы в работе способствуют фиксации тенденций в медиа разных типов, что даёт возможность заложить основы для обучения искусственного интеллекта, впоследствии распознавать возражение в сфере распространения научного знания, связанное с непониманием, негацией, скепсисом и др. На материале 288 текстуальных единиц из Telegram-каналов трёх медиа, популяризирующих науку и носящих информирующий характер, делается вывод, что локация и частота появления фрейминговой техники в тексте соцсети характеризует качество и степень подготовки аудитории. В результате исследования количественно подтверждена экспликация фрейма «новое знание» через компоненты следующих семантических микрополей: а) ход

изучения; б) результат изучения; в) субъект научной работы; г) сопоставление нового знания со старым; д) новизна знания; е) отрицание старого знания. Перспектива описания фрейма – подготовка алгоритма машинного распознавания его единиц в речевом материале для дальнейшего изучения стилистики возражения. Предпринятые наблюдения способствуют выработке принципов по реализации глубокой работы с коммуникативной резистентностью адресата и расширению его концептуального поля, а также позволяют выдвинуть обоснованные предположения о возможностях программируемости научно-популярных медиатекстов.

Ключевые слова: фрейминг, компьютерная лингвистика, научно-популярный дискурс, автоматический анализ текста, возражение

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Introduction and Problem Statement. The texts of popular-scientific media often contain a subjective framework that presents signs to highlight the most "fascinating aspects, to induce intellectual emotions of interest, to stimulate curiosity, to explain and interpret, and to provide a rational assessment of the scientists' work" [1, p. 97]. This framework also helps to prevent misunderstandings, doubts, and objections. It is important to note that subjective assessments should be clearly marked as such in order to maintain objectivity. However, it is also true that today the populariser is often faced with the task of providing "entry points" for readers to access scientific knowledge without having to delve deeply into the text. When discussing the content and meaning of a popularisation text, it is important to maintain a balance between formalisation and variability of form. Authors may wish to increase the variability of the interpretive frame, but must also consider the audience's ability to understand the content. This often requires formalising the frame, which may lead to the use of framing techniques or frame shifts. In this study, we analyse these techniques using the example of the "new knowledge" frame. Given the audience's need to identify and validate message content quickly, the "new knowledge" frame is most effective for analysing linguistic variability in popularisation media discourse when communicating scientific discoveries and achievements.

When describing the scope of the frame's presence, it is important to note that the field of science popularisation in the media has undergone significant changes. Popper [2] claimed that scientific knowledge belongs to the world of objective theory, issues and arguments, as opposed to being subject to subjective judgments. But the scientific message is subjected to a secondary linguistic interpretation [3] as it is refracted through the prism of popular science discourse. As a result, new models of interaction between the message author and recipient are required in the updated media space. This places the objective scientific knowledge, which is part of the message, in the new media environment leading to formal changes. Today, the Telegram channels posts are the starting point from which familiarity with the 'final' product, such as a full-text article, begins, and the percentage of the audience reached by this product is also unpredictable.

The Telegram channels posts, which includes the channel title and caption for illustrations, as well as a brief summary of the news or somebody's views, have crucial value for science popularisation today [4]. While presenting scientific information in Telegram posts, the sense of evidence, completeness and clarity that usually characterise scientific communication is not always preserved. Such processes may lead to failures in the model of interaction with the audience, and the popularizing components themselves may also provoke a communicative resistance [5; 6] in the addressee. This is why media professionals need to focus not only on semantics, but also on formal aspects of organising media texts. Sociology, political science and journalism have discussed the concept of gatekeeping, which refers to the control of the flow of information by gatekeepers. Recent attempts have been made to make this process algorithmic [7], but this can be a challenge for popular science discourse due to its specific nature.

In the realm of the media, readers may exhibit a "motivated scepticism", in which they are highly critical of refutations. As noted by Ponomarev [8], in order to maintain objectivity, individuals often refrain from making assessments and instead use counter arguments to challenge opposing viewpoints. Therefore, the audience's perception of a message, including scientific messages, may not always be ratio-

nal or logically explainable. This tendency provides the basis for the development of an algorithm that includes the main markers for the recognition of the 'new knowledge' frame, since communicating information about the new is the main goal of popular science media of the information type [9].

Today, social networks operate on the basis of human attention, which refers to the degree of concentration and subsequent ability of the audience to carry out the required action. The interface of social networks and messengers now includes buttons with pre-set reactions and actions. This creates a programming effect, where epitext locally and paratext globally influence the audience's perception of the world [10]. This effect occurs even without full immersion in the subject matter, such as when reading an article. The parameters set by the programming effect guide individuals to the information they need, even in a text reduced to a social network summary or a single headline. Framing acts as a pre-attentive system that influences the user's decision-making process, directing the user's attention to the necessary information at the most appropriate place and time [11, p. 218]. Attempting to algorithmise the introduction of the concept of "new knowledge" by building a model [12] in a popular science text will enable the development of effective strategies to counteract communicative resistance from the audience.

Background. Frames (as idealised cognitive models) are developed within cognitive linguistics [13], which among other things studies the relationship between semantic and formal language structures and argues that frames are closely related to social and psychic processes [14]. In various fields of research, including linguistics, sociology, psychology and political science, frame recognition is a fundamental concept. A frame refers to "data structures for representing a stereotypical situation" as proposed by M. Minsky in the 1970s [15, c. 5]. Later, C. Fillmore expanded on this concept by suggesting that language creates "frames of experience" that can later be indexed and used to construct a particular context [16]. Combining the conclusions of C. Fillmore and M. Minsky, it can be said that frames in linguistics are knowledge structures capable of reproducing certain expectations from a particular phenomenon considered in a frame in human consciousness [17, p. 21]. R. Langacker [18] considers frames to be cognitive patterns at different levels of the language. B. Gasparov [19] developed an approach to studying frames, stating that the semantic organisation of a text is expressed only as a sequence of linguistic units with their meanings and communicative contour. In other words, the text represents a matrix with specific parameters that can be reproduced consistently and unambiguously. It contains cells with embedded semantic components.

Frame theory was developed in linguistics by sociologist E. Goffman and anthropologist G. Bateson to address meaning construction at local and global discourse levels [20; 21]. In our research, it is also important to take into account communication scholars who have applied their knowledge of frames to the analysis of media communication. R. Entman [22] emphasises the importance of the salience and visibility of the nodes of the frame, which contribute to defining the problem, interpreting causality, making moral judgements and making recommendations. The correlation of the elements in the frame matrix and the hierarchical structure of the frame are also essential. Frame as a means of information schematization eases an information processing for the audience to accommodate new information into their existing frames: "These frames allow us to understand issues in particular ways, and also guide news work and audience responses to media content" [23, p. 115]. However, the use of frames in the media has raised questions among scholars about how readily audiences accept such framing. Research has shown that frames primarily interact with the recipient's memory and reinforce his or her stereotypical ideas about the object [24]. This has led to the emergence of counterframing, where audiences contradict dominant textual themes and meanings [22].

The concept of framing, particularly strategic framing, is currently used in psychology, communication studies, management and related disciplines to describe intentional actions to influence and shape the algorithm for working with an audience, team or other social group [21; 25–27]. Framing divides the idea of any element of reality into salient and visible components designed to emphasise the message and elicit a favourable or intended response [28]. Quite similar to gatekeeping theory, framing is most commonly used in advertising and politics. In other words, the framing approach regulates the degree of openness

and closeness of the media – which makes it methodologically useful for two reasons. Firstly, it objectively characterises the media and discusses their relationship with the audience and the authorities (or those to whom the media are subordinate). Secondly, it supports framing analysis by allowing the application of quantifying methods and the clear formulation of frame terminals at lexical, morphological, and syntactic levels. This approach allows qualitative analysis of language matrices and avoids reductionism by not creating universal guidelines that do not take into account linguistic diversity and variability of forms. The framework is thus considered a qualitative construction.

So, our research analysing the popular science media texts from the perspective of possible framing applications provides basis for further studies in finding automating ways of avoiding audience objections.

Materials and methods. Therefore, we decided to use the theory of framing for our methodology. In our work, we have departed from the expected graphematical analysis [29], as our research is exploratory and the aim is to explicate the content of the "new knowledge" frame and highlight its terminals. In order to provide a new interpretation of the actions of the popularisers, our focus is on the emphasis on any knowledge positioned as new one in the text. Hence the mixed techniques of quantitative and qualitative media research were used, e. g. by developing requirement signs of analysed units to interpret information contained in popular science channels in an algorithmic way.

The study focuses on morphological features, such as part of speech, and semantic signs, including the sign *'process'* and its various meanings such as *'becoming'*, *'emergence'*, *'beginning'*, *'implementation'*, *'continuation'*, *'suspension'*, *'resumption'* and *'outcome'*.

Thus, through a necessary methodological sequence, we achieve a clear and concise description. It should be noted that the term 'attribute' refers to a category with a specific meaning.

The study is divided into four phases.

1. In the preparatory phase, we established the principles for the selection of the material. Our primary sample consisted of Telegram channels whose main purpose is to provide information about science, the so-called "news trajectory of popularization" [9]. The sample excluded advertisements, which do not always contain a scientific message and may be written by clients rather than the authors of the media, as well as reposts, which are not products of the studied media. The sample included textual material and covered the period from 1 December to 14 December 2023.

2. Based on the previously developed criteria, the second step was to select the text units to be studied. We then carried out a systematic sampling and examined the content of three popular science publications on the Telegram platform: High-tech, N+1, and QWERTY.

3. We identified the principles of modelling the content grid of each medium and nominated the dominant framing techniques applied to the representation of knowledge. The result was a set of 288 units and a list of eight principles for the study of the terminals of the "new knowledge" frame.

4. We cross-tabulated the elements to determine the prevalence of a principle based on the types identified.

To create an array of information, a qualitative sample to select had been tasked. To achieve this goal, we proposed rules for interpreting the verbal component of the text and fixed the values of the prescribed signs. For that purpose, we proposed rules for the interpretation of the verbal component of the text and fixed the values of the predetermined characters. Having analysed the material, we found that the "new knowledge" frame could be represented by the following morphological features:

– Adjectives in a comparative degree made by means of formative suffixes such as *-ee/ei* (Russian *-ей*), *-e* (Russian *-е*), *-she/-zhe* (Russian *-ше/же*), or suppletive forms. In addition, the prefix *po-* (Russian *по-*) can be used to indicate that something is more recent (e. g. Russian word *поновее*).

– Adjectives in a superlative degree: formative suffixes *-eish- / -aish-* (Russian *-ейш/ айш*); prefix *nai-* (Russian *наи-*); element *the most*; element *the most / least*.

– Adverbs containing a composite comparative degree: element *more / less* (Russian *более / менее*).

– Temporal adverbs: *first* (Russian *вначале-*), *before* (Russian *раньше*), etc.; *before* (Russian *прежде*) + verb of opinion or thought.

– Numerals.

Also, the "new knowledge" frame is represented by a number of semantic features formed in synthesis with some morphological meanings, for example:

– Verb forms with prefixes of resultiveness (*found, searched out* (Russian ***от**искал, **вы**яснил*); verb forms with the meaning of procedural.

– The particle *'not'* is used to denote a new element as a negation of old knowledge.

– Prepositions as a manifestation of opposition, denial of past experience, comparisons for layering new knowledge.

– Prepositions and conjunctions as indicators of time leading to processability (*during* (Russian *в течение, на протяжении*) → *result*).

– In the "new knowledge" framework, we include the most typical words found in lexical-semantic areas. The selection included words in Russian meanings *'new'*, *'old'*, *'scientist'*, '*science'*, *'discovery'*, *'research'*, '*search'* and their related forms. In view of the need for originality and the inherent characteristics of knowledge, e. g. the fact that scientific discoveries build on previous knowledge and involve the development of new principles and approaches, we manually selected appropriate verb forms, but future plans include a more detailed exploration of the characteristics of each category. The text therefore presents all the extracted grammatical and lexical-semantic information consistently in terms of signs and their meanings.

Research results. In the course of the study, eight groups of attributes were identified, among which were the following:

1. The lexicon of the frame "new knowledge" (*scientist, science, discovering, researching, investigating, searching*).
2. Adjectives in the comparative and superlative forms of expression.
3. Adverbs.
4. The 'not' particle.
5. Verb forms with the meaning of proceduralisation.
6. Numerals.
7. Conjunctions.
8. Prepositions & Conjunctions.

In the section 'Materials and Methods' these features are described in more detail. The data below have been collected by means of quantitative methods. We propose to use two coefficients to obtain indicative values from the generated array.

The first coefficient calculates the proportion of frame indicator, which is the number of items containing a frame feature divided by the total number of textual units in the array (see the Figures 1–8). This provides insight into the number of frame receptions and is calculated using the following formula:

Proportion of frame indicator = number of posts that include a frame feature / total number of textual units

The total number of frame receptions detected in the array was counted to determine the second parameter. This number represents the ratio of each parameter for a given medium and is calculated using the following formula:

Frame technique ratio = number of units containing a particular frame technique / total number of all textual channel units

The lexicon of the frame serves as a search criterion for the potential algorithm and aids in the identification of action agents, such as *scientists*. It is the primary element of the search because it contains the term 'new', which was included in the list of words forming the frame.

The vocabulary used in the text of popular science media is designed to help the reader to quickly identify the new and innovative aspects of the knowledge presented. As a result, this parameter had the highest quantitative indicators. The presence of the marked feature in the media indicates the volume of word play that is typically not machine-processed, allowing us to gauge the communicative distance of the authors and the risk of objectionable reactions resulting from journalistic exaggeration.

Including comparative and superlative adjectives serves to report changes and updates in information about the subject's condition. However, the calculations in the graph show that this feature is rarely used in the total set of criteria, suggesting that the broadcast message may not be very clickable. When analysing the data, it is recommended to create a gradation of the quantitative results: the percentage characterising the parameter measures the degree of potential communicative failure caused by overusing superlatives.

The adverbs in the sample can be correlated with two groups simultaneously: adjectives and prepositions/conjunctions, because the adverb group contains an element of compound comparison (relevant to adjectives) and reflects processivity. However, this criterion also determines the quality of the audience and its demands on the popular science media message, in contrast to the latter group, where the intended lexicon is initially narrower.

The use of the particle 'not' in this selection is particularly interesting, as it encompasses a variety of morphological categories, including conjunctions such as *'not only but also'*. By manually analysing the text, we identified morphological variations that ended up representing a new element without nominalisation, but with negation of other notions. This method allows the discovery of new information based on the principle of negation, intrinsic to scientific knowledge as it updates and corrects itself.

The lexicon of the frame "new knowledge"

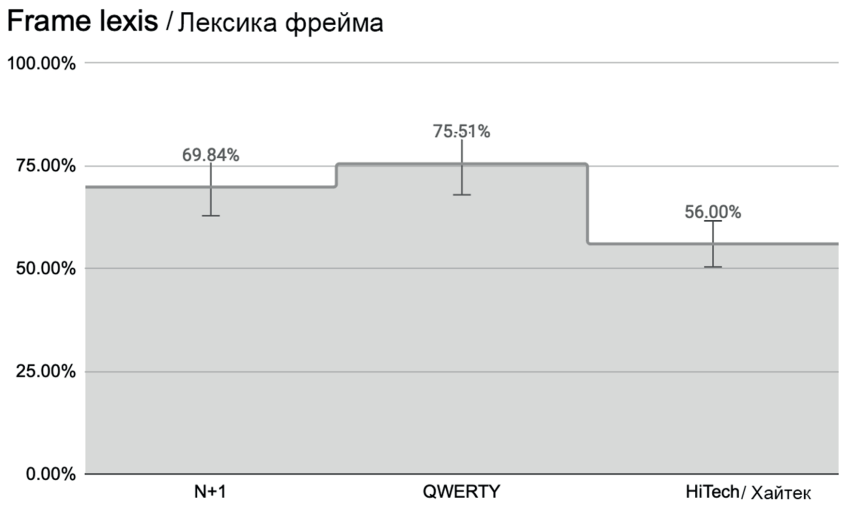

Fig. 1. Comparison of the frame percentage indicator 'Frame lexis' in three media: Hitech, N+1, QWERTY

Рис. 1. Сравнение индекса процентного соотношения фреймового индикатора «Лексика фрейма» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Adjectives in the comparative and superlative forms of expression

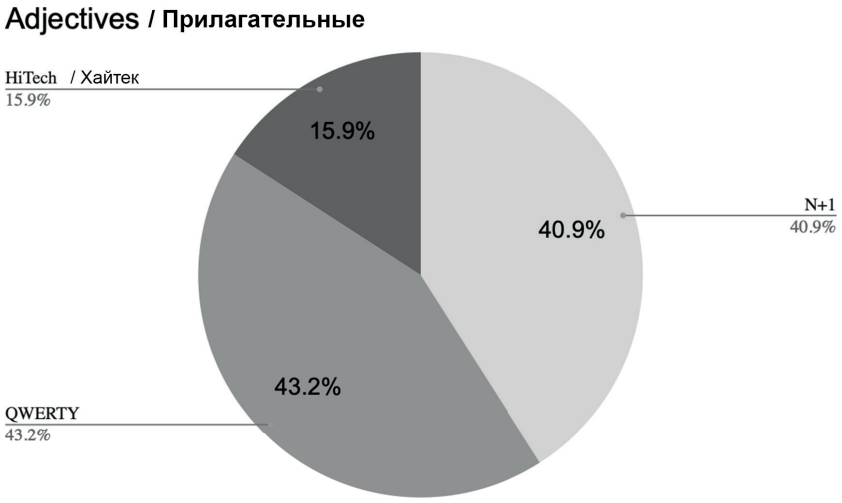

Fig. 2. Comparison of the frame percentage indicator 'Adjectives' feature in three media: Hitech, N+1, QWERTY

Рис. 2. Сравнение индекса процентного соотношения фреймового индикатора «Прилагательные» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Adverbs

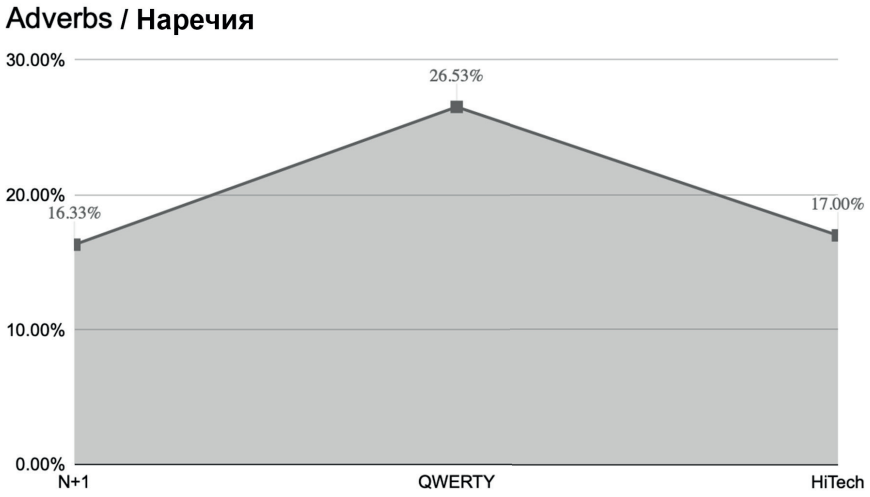

Fig. 3. Comparison of the frame percentage indicator 'Adverbs' in three media: Hitech, N+1, QWERTY

Рис. 3. Сравнение индекса процентного соотношения фреймового индикатора «Наречия» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

The 'not' particle

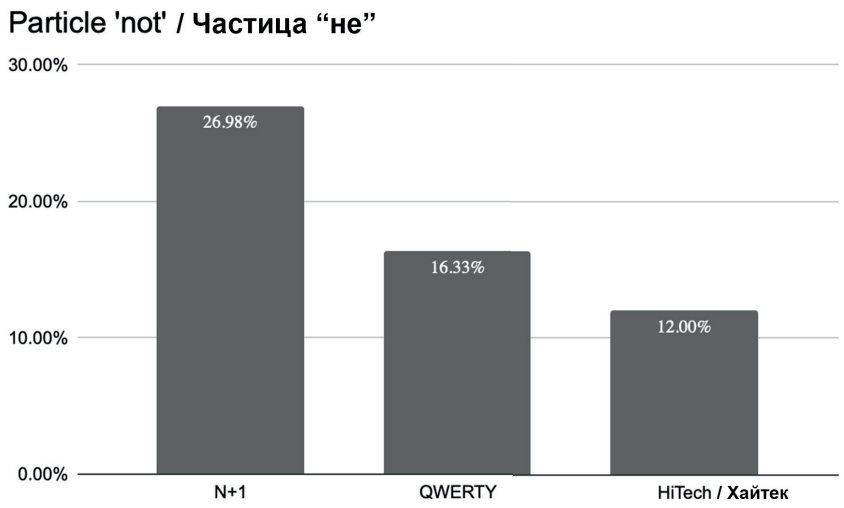

Fig. 4. Comparison of the frame percentage indicator Particle 'not' in three media: Hitech, N+1, QWERTY

Рис. 4. Сравнение индекса процентного соотношения фреймового индикатора «Частица "не"» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

The algorithmisation of verb forms is particularly challenging. While other morpheme-grammatical parameters can be set unambiguously, verb forms require a set of morphemes (interfixes) that can fully encompass the semantic meaning of the colloquial form of verbs, such as the verb ***выискать*** (*'to search')*. Despite this difficulty, verbs can convey both actionality and cliché. Hence, messages containing the forms *'to find'*, *'to study'* and *'to prove'*, which are specific to the "new knowledge" frame, may be ignored by the audience as potentially uninteresting.

This category typically represents the results of a scientific activity and is therefore included in

the list of attributes. In spite of the abundance of data and the possibility that it may become outdated, this attribute contributes to the acceptance of new information by the audience [30].

In this case, it represents the opposition of old and new knowledge. The study shows that most of the conjunctions contain a concession or negation, but additional approaches are needed for popular science media. The thesis currently unifies the feature by communicating its typical morphological meaning.

Verb forms with the meaning of proceduralisation

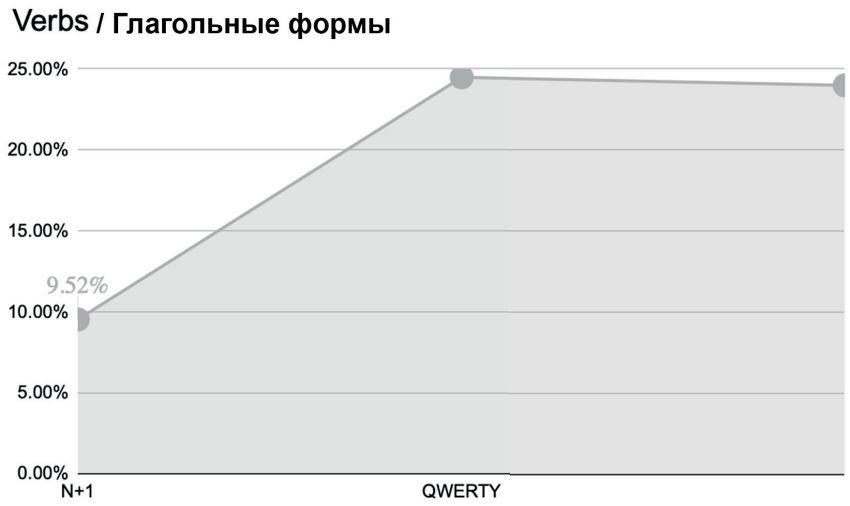

Fig. 5. Comparison of the frame percentage indicator 'Verbs' in three media: Hitech, N+1, QWERTY

Рис. 5. Сравнение индекса процентного соотношения фреймового индикатора «Глагольные формы» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Numerals

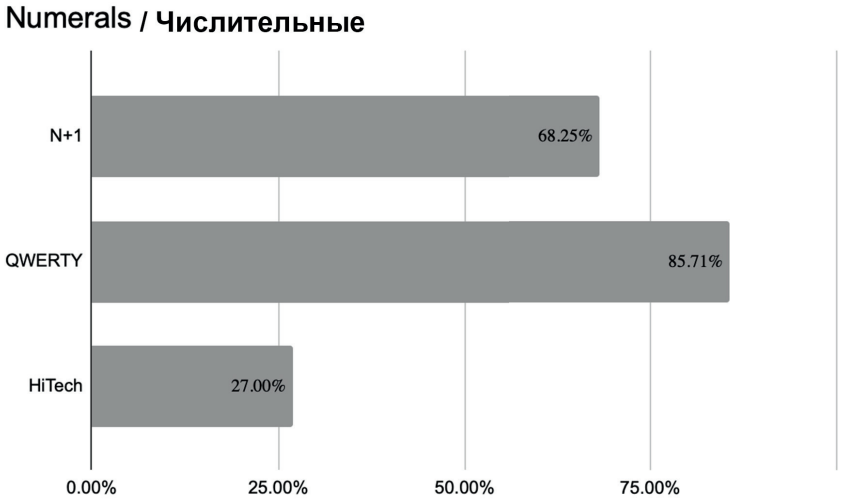

Fig. 6. Comparison of the frame percentage indicator 'Numerals' in three media: Hitech, N+1, QWERTY

Рис. 6. Сравнение индекса процентного соотношения фреймового индикатора «Числительные» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Conjunctions

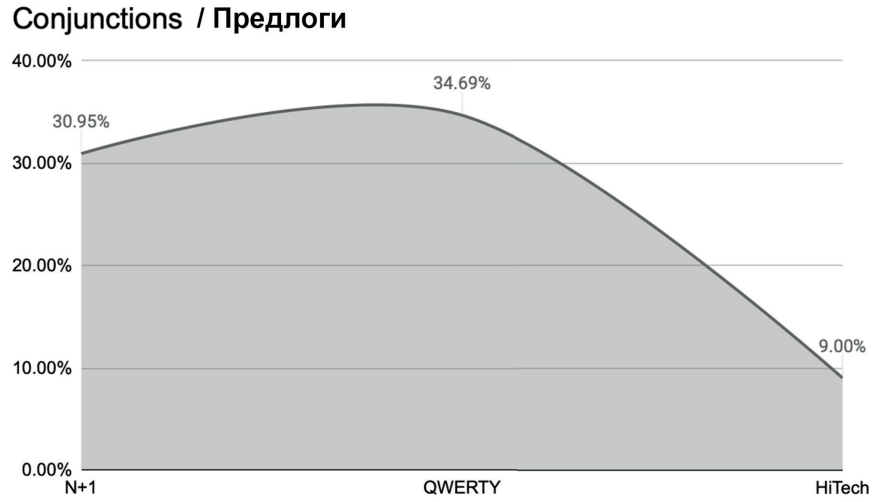

Fig. 7. Comparison of the frame percentage indicator 'Conjunctions' in three media: Hitech, N+1, QWERTY

Рис. 7. Сравнение индекса процентного соотношения фреймового индикатора «Предлоги» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Prepositions & Conjunctions

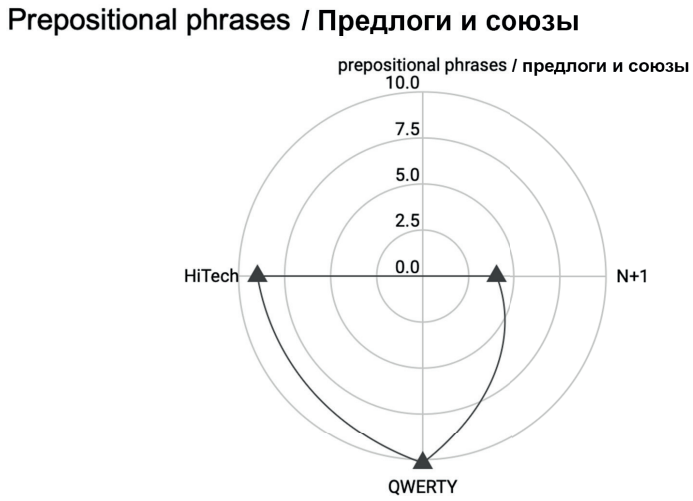

Fig. 8. Comparison of the frame percentage indicator 'Prepositions & Conjunctions' in three media: Hitech, N+1, QWERTY

Рис. 8. Сравнение индекса процентного соотношения фреймового индикатора «Предлоги и союзы» в трёх научно-популярных медиа: Hitech, N+1, QWERTY

Finally, in our study we found an attribute, which is part of the group of prepositions mentioned above, that is semantically characteristic of processuality. In our case, words such as *в течение* (*'during'*) and *в продолжение* ('*continuing*') can be highlighted as a separate category. Thus, we can identify messages that accurately reflect scientific activities, e. g. research as such, the verification of results and the subsequent control of the importance of the information.

Discussion of the research results. Considering the strategic framing discussion mentioned above we can extend the observations

made in previous researches on advertising, media, and political discourse [21–28]. Thus, we can apply the highlighted frame system, which includes strategic frames, to our study of popular science media text. Strategic framing allows media professionals to effectively convey their message by adjusting the intensity of the attributes in a way that is necessary for the audience. The identified attributes can also be classified as collective action frameworks that provide inspiration and legitimation for action and thereby influence the success of reading and subsequent perception of information [31; 32].

The article discusses the integration of the frame "new knowledge" into the text of popular science Telegram channels. In the research, the frame is conceptualised as a strategic framing tool for science popularisation. The lexical and morphological indicators of this framing serve as a gateway for standardising and typifying a media text about science, allowing the reader to identify it as a scientific text and decide whether to read on about the research or discovery.

The representation of the frame "new knowledge" in the text of popular science media is a technique used to prevent reader's communicative resistance. This resistance can arise for various reasons, such as misunderstanding, objection, doubt or denial, which may hinder the reader's ability to perceive the information presented in the text. It is assumed that in media platforms that position themselves as popular science, the presence of indicators of the above framework can influence the decision-making process regarding the continuation of the interaction.

To test the hypothesis that the use of the term 'new knowledge' affects audience engagement, we compiled a corpus of comments and applied the same feature principles used for posts in Telegram channels. The ratio is a measure of the audience's influence and perception of the 'new knowledge' frame. It should indicate how far the frame features have been adopted by the message receiver. The coefficient is calculated using the following formula:

Commentary aspect = number of messages containing the frame attribute / total number of comments in the channel.

The analysis of the text corpus revealed distinct patterns of frame representation in the media text. A preference for the use of lexical means to construct the content grid (parameter one – total number of frames used) was found in two of the three media channels studied. The ability of this element to engage users, i. e. its ability to attract users who respond by using the same frame lexicon in their comments, was analysed in order to evaluate its effectiveness as a framing element. A coefficient, calculated according to the formula, was obtained for the comment component:

Frame technique ratio = number of units containing a particular frame technique / total number of all paratextual channel units.

Importantly, the features obtained by this indicator and those correlated with them have a much smaller quantitative presence.

The study confirmed the predominance of the lexical feature in identifying units that mark the novelty of the knowledge presented, but the analysis of users' commenting activity revealed that the high use of quantitative features (numerals) in Telegram posts corresponded to the commenting discourse. Involved users react to quantitative features of scientific data constituting new knowledge: N+1 (12.7 %), QWERTY (11.06 %). It should be noted that Hitech is inferior to others in this criterion. The comments on its channel are mainly composed of a lexical component (30.95 %).

The correlation between the use of framing in the posts and in the response commentary can be indicated by an important parameter, which includes elements with the semantics of comparing and contrasting. Users tend to use comparative adverbs, characterising a new quality of action regarding the object studied and qualitative changes in the actions of the scientific search actor, as observed in Hitech (2.38 %), N+1 (3.49 %), and QWERTY (4.16 %).

These lexico-morphological features, which were identified based on qualitative and quantitative characteristics of frame representation, are correlated with levels of user participation in communication. The productivity of textual framing and the potential for algorithmic construction of popular science texts is demonstrated by the fact that commentators respond to key components of frames with comparable volumes of messages. However, the presence of politicised dialogue and a lack of messages containing the attributes of the 'new knowledge' frame may explain the low percentages obtained in studies of this indicator. In our sample, the QWERTY channel had the lowest indicators: the discussions between the participants were mainly about political issues and included

objections that were not related directly to the denotation of the communication.

Conclusion. Framing techniques establish the structure of a textual component, and the frequency and dominance of each technique helps to determine the strategy of the publication and its relationship with its audience. This data can be useful to researchers in the development of counterarguments and error descriptions in the study of publications, and advertisers can also benefit from this quantitative data on framing criteria in order to determine the effectiveness of a particular message.

The location of the framing technique also characterises the audience, and the assumed recipient will differ depending on the medium. If the frame appears in the title, the author is considering the communicative resistance of the audience, their basic level of knowledge and emotional expectations. If the frame appears in the body of the text, it is expanding the reader's conceptual field by building on what they already know. But communicative resistance may occur if the reader does not experience the joy of learning or does not gain new knowledge. It is important to consider these factors. The frequency of a particular technique can indicate the audience's readiness. If a technique is used too often, the audience may become fatigued. On the other hand, the presence of certain signs, such as numerals, can indicate that the audience is ready for a longer interaction with media content. This can have an impact on a journalist's choice of framing techniques.

Another important conclusion from algorithm development is that reproducibility of labelled features remains the most challenging. It is possible to train the algorithm to find specific morphological, syntactic or grammatical features, but the context will continue to be an obstacle. At present, the variability of topics and types of popular science media makes it impossible to produce a universal list of criteria for content search and creation.

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Contribution of the authors to the article

Ivanova L. Y. – defined the problem field of the research area and conceptualised both the theoretical and practical results.
Udaltsova A. R. – assembled the background material, collected empirical evidence, formed the data set, and designed the text of the article.

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