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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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USING PSYCHOLINGUISTICS IN DEVELOPING THERAPEUTIC METHODS FOR OVERCOMING ANXIETY STATES

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Abstract.

Purpose: The study aimed to identify the relationship between speech characteristics and anxiety levels to identify psycholinguistic markers that can serve as diagnostic tools in psychotherapy practice.

Methods: A sample of 160 participants was stratified by anxiety level (high, medium, low) using standardized methods (STAI, BAI). Quantitative analysis showed significant differences in the speech of the groups: participants with high anxiety used shorter sentences, were characterized by a lower level of lexical diversity, more frequent use of negatively colored vocabulary and the pronoun "I", and also used future tense forms less often.

Results: Correlation and regression analyses confirmed the close relationship of these speech indicators with anxiety levels, which explained up to 48% of the variation on the BAI scale. The results suggest that speech analysis can be a reliable indicator of anxiety levels and can be integrated into psychotherapy practice as an additional diagnostic tool. The resulting speech profile of a highly anxious individual—negative vocabulary, self-referentiality, cognitive simplification, and low future orientation—can be used to individualize psychotherapeutic interventions and monitor therapy dynamics.

Conclusions: Practical applications include regular speech analysis, working with written texts, and integrating automated analysis systems into clinical and online environments. A promising direction is to expand the sample and test the cross-cultural validity of the resulting model.

Key words. Anxiety, diagnostic markers, lexical diversity, psycholinguistics, stress.

Introduction.

The fast pace of life, social changes, hostilities, pandemics, high levels of information overload affect the level of psycho-emotional stress and anxiety, which are growing every year. Anxiety disorders have become one of the most common psychological problems faced by a significant part of the population of different ages and social status [1,2]. According to research, internal anxiety disorders have a negative impact on physical, mental health and quality of life [3,4]. Within the framework of modern psychotherapy, it is important to look for new, more effective approaches to the treatment of anxiety states that are based on empirical data and take into account the individual characteristics of patients [5].

One of the promising areas within this topic is the use of psycholinguistic approaches. Psycholinguistics plays the role of an interdisciplinary science that studies the relationships between language, thinking and human behavior [1,6]. It provides important, but at the same time, unique opportunities for analyzing the inner world of a subject through his speech, which is manifested in thoughts, beliefs, affects and stereotypes [7]. Language is not only a means of communication, but also the key to revealing the deep psychological processes that occur in patients with anxiety disorders [8,9]. In particular, the article by Q. Wang et al. indicates the influence of anxiety on language parameters, on articulation accuracy, vowel clarity and formant width, which change under the influence of stress [10].

The authors also found that anxiety can impair articulatory accuracy and reduce vowel clarity. Scholars also described the application of psycholinguistic theory in the process of language learning to improve cognitive understanding, emotional impact and speech perception [11,12]. Besides, M. Malgaroli et al. applied natural language processing (NLP) methods to identify linguistic markers that distinguish changes in anxiety and depression symptoms during treatment [13]. B. Teferra et al. proved the effectiveness of a model that predicts the presence of generalized anxiety disorder (GAD) using acoustic and linguistic characteristics of spontaneous speech [14]. In addition, O'Dea and others have identified associations between individuals' linguistic characteristics and their symptoms of depression, generalized anxiety, and suicidal ideation [15]. Some authors have also used natural language processing tools to analyze text and identify correlations with mental health and have demonstrated the value of psycholinguistic methods [16,17]. Analysis of the content, structure and features of speech allows us to identify specific manifestations of anxiety, as well as to formulate individual approaches to therapy [18-20]. Thus, at the current stage of the development of psychotherapy, it is important to study the role of speech in the emergence, development and overcoming of anxiety states from the standpoint of empirical science. The use of psycholinguistic methods in therapeutic practices has the potential to increase the effectiveness of treatment, since it allows us to consider the peculiarities of the internal experience of each patient. At the same time, it is necessary to analyze empirical data and substantiate the correlation of speech characteristics with the level of anxiety. The research problem is that currently there is a lack of sufficient scientific data on the empirical relationships between speech and the level of anxiety, and specific psycholinguistic models that are effective in therapeutic measures have not been identified.

Thus, the purpose of the study is to identify patterns between the characteristics of patients' speech and their level of anxiety and to formulate recommendations for the use of psycholinguistic methods in the therapy of anxiety states. The main tasks are as follows:

1. To identify the main speech characteristics that can be markers of an increased level of anxiety.
2. To investigate the relationships between the characteristics of patients' speech and their level of anxiety based on empirical data.
3. To substantiate the effectiveness of the use of psycholinguistic methods in therapeutic practices.

Methods.

This study is an empirical, correlational and descriptive article, as its main goal is to identify patterns between the speech characteristics of patients and the level of anxiety. The empirical nature of the study influenced the collection of data directly from the participants (oral and written statements) and the assessment of their anxiety level using standardized psychodiagnostic techniques. At the same time, the use of correlation made it possible to establish a relationship between speech manifestations and anxiety indicators. This method has become especially important for the development of psycholinguistic therapeutic recommendations.

Sample and participants:

160 respondents aged 18 to 45 years participated in the study. Participants generally represented different social groups (students, office workers, medical workers, emergency responders). The inclusion criteria were based on the following points: 1. absence of diagnosed serious mental illnesses (schizophrenia, bipolar disorder, etc.); 2. Proficiency in Ukrainian as a basic or high level; 3. Voluntary informed consent to participate; 4. Willingness to provide oral and written speech materials.

Exclusion criteria included voluntary refusal to participate at any stage, use of psychoactive substances before the study, and the presence of acute somatic or mental conditions that prevent participation.

The stratification of participants is as follows:

1. Group A – high level of anxiety: 50 people;
2. Group B – medium level of anxiety: 60 people;
3. Group C – low level of anxiety (control): 50 people.

The division was made according to the results of the Spielberger–Hanin scale (STAI) and the Beck scale (BAI).

Materials and tools:

In order to determine the level of anxiety of the study participants, standardized psychodiagnostic tools were used, which made it possible to determine both situational and personal anxiety: 1. State-Trait Anxiety Inventory, STAI - a technique that made it possible to assess two components of anxiety: situational (state of anxiety at a specific moment) and personal (anxiety as a stable personality trait). This tool is widely used in modern clinical and scientific research and has proven validity and reliability. 2. Beck Anxiety Inventory, BAI. This is a standardized questionnaire for quantitative assessment of the level of anxiety, which allows to identify the severity of anxiety symptoms and determine groups of participants by the level of anxiety.

Speech materials:

For psycholinguistic analysis, oral and written speech manifestations of the participants were used. Oral interviews lasting 5–7 minutes were planned on the topics: “My typical day”, “The most difficult event”, “My plans for the future”. The interviews had a semi-structured format. Such instruments made it possible to obtain information-rich answers and free statements from respondents, which revealed the linguistic features, affective assessments and cognitive patterns of the participants.

Written essay texts of up to 200 words on the topic “What does safety mean to me”. In addition, written speech was supplemented by an oral interview, which made it possible to assess the features of the cognitive organization of thoughts and emotionally colored vocabulary.

Procedure:

The study was conducted in several logically consecutive stages. At the first stage (psychodiagnostic), STAI and BAI tests were conducted to determine the level of situational and personal anxiety of the participants and groups were formed according to the level of anxiety (low, medium, high). The next stage involved the collection of speech materials. This involved conducting semi-structured oral interviews and written essays, recording oral responses using audio recordings and then transcribing them for analysis. The third stage involved psycholinguistic analysis, which involved content analysis of transcribed oral and written materials by semantic, lexical, and stylistic categories. Specific speech patterns were also identified at this stage.

At the next stage, statistical analysis was performed, in particular, a quantitative analysis of language characteristics (frequency of use of emotionally colored words, syntactic complexity, use of pronouns) was conducted. Also at this stage, correlation and regression analysis were performed to identify the relationship between language parameters and the level of anxiety. The last stage involved the interpretation and generalization of quantitative and qualitative results.

Data analysis:

Data analysis was carried out using quantitative and qualitative methods. For quantitative analysis, statistical methods were used that made it possible to verify the presence of a relationship between speech parameters and the level of anxiety. Descriptive statistics were used, namely the calculation of mean values, standard deviations, minimum and maximum indicators of speech and psychodiagnostic parameters. Comparative analysis involved the use of a t-test for groups and analysis of variance to compare the three groups by the level of anxiety. This made it possible to establish statistically significant differences in speech characteristics between groups with low, medium and high levels of anxiety. Correlation analysis was also used to calculate Pearson correlation coefficients between anxiety indicators and specific speech parameters (frequency of emotionally colored words, use of pronouns, syntactic complexity, etc.). Regression analysis involved multivariate linear regression to identify predictors of anxiety levels in speech. It is also important to conduct lexical diversity. Lexical diversity (type–token ratio,

TTR) was calculated as the ratio of the number of unique word types to the total number of word tokens in a participant's speech sample. This index reflects the variability and richness of vocabulary use: higher values indicate a wider and more varied lexicon, whereas lower values (as observed in participants with high anxiety) denote a tendency toward repetition and restricted linguistic output.

At the same time, qualitative analysis made it possible to reveal the semantic content of speech and identify cognitive-emotional patterns. It was manifested in the coding of oral and written statements by semantic categories ("fear", "risk", "uncertainty", "safety") and the identification of thematic repetitions and speech clichés. Based on interpretive analysis, cognitive strategies and thinking models of participants were identified, as well as specific speech markers of anxiety. Thus, the synthesis of quantitative and qualitative analysis made it possible to record the relationships between speech parameters and anxiety levels and to empirically confirm semantic and lexical patterns that are found in the speech of participants.

Results.

In the study, the mean values of the STAI and BAI scales were obtained, as well as the main speech indicators. Participants with high anxiety (Group A) showed a mean score of 62.4 (SD=7.1), which exceeded the mean level (49.2) in Group B and the low level (36.5) in the control group. The difference was statistically significant ($p < 0.001$). This indicated that the stratification of the sample was valid, that is, the groups differed in their baseline levels of anxiety. The situational anxiety index (STAI) was also similar. In particular, the highest index was in Group A (58.7), the average in Group B (45.6), and the lowest in control (32.1). Thus, in the same situation, the level of anxiety was correlated with personality characteristics. Considering the Beck Anxiety Inventory (BAI), the average score in Group A (27.9) indicated pronounced clinically significant anxiety symptoms, in Group B (18.4) - a moderate level, while in the control group (9.7) only mild or absent symptoms were noticeable.

As can be seen, the group with a high level of anxiety was characterized by shorter sentence length, less lexical diversity

Table 1. *Descriptive statistics of anxiety level and speech characteristics.*

Indicator	Group A (high)	Group B (medium))	Group C (low)	p (ANOVA)
STAI – personality anxiety	62.4 (SD=7.1)	49.2 (SD=6.8)	36.5 (SD=5.9)	<0.001 ***
STAI – situational anxiety	58.7 (SD=8.0)	45.6 (SD=7.2)	32.1 (SD=6.5)	<0.001 ***
BAI – total score	27.9 (SD=6.5)	18.4 (SD=5.8)	9.7 (SD=4.2)	<0.001 ***
Average sentence length (words)	9.8	12.1	15.6	<0.001 ***
Lexical diversity (types/tokens)	0.47	0.58	0.71	<0.001 ***
Emotionally negative words (%)	14.5	9.2	4.1	<0.001 ***
Emotionally positive words (%)	3.2	6.1	10.4	<0.001 ***
Frequency of pronouns "I" (%)	11.8	8.6	5.2	<0.001 ***
Frequency of future tense (%)	2.9	5.8	8.7	<0.001 ***

Note: p-values are from one-way analysis of variance (ANOVA).

Table 2. *Correlation coefficients between anxiety level and speech characteristics (n=160).*

Indicator	STAI (personal) STAI (situational)	STAI (personal) STAI (situational)	BAI
Sentence length	-0.46 ***	-0.41 ***	-0.44 ***
Lexical diversity	-0.52 ***	-0.49 ***	-0.47 ***
Negative words (%)	0.58 ***	0.55 ***	0.62 ***
Positive words (%)	-0.44 ***	-0.39 ***	-0.36 ***
I pronouns (%)	0.42 ***	0.39 ***	0.40 ***
Use of future tense	-0.37 ***	-0.33 **	-0.29 **

*Note: *p < 0.05; **p < 0.01; **p < 0.001*

Table 3. *Regression model for predicting anxiety levels (dependent variable – BAI).*

Predictor	β (stand.)	t	p
Negative vocabulary (%)	0.39	5.72	<0.001 ***
Lexical diversity	-0.31	-4.89	<0.001 ***
I pronouns (%)	0.21	3.26	0.002 **
Sentence length	-0.18	-2.73	0.007 **
Positive vocabulary (%)	-0.14	-2.21	0.028 *
Future tense use	-0.09	-1.42	0.157 (ns)

$R^2 = 0.48$, $p < 0.001$

Table 4. *A generalized table of thematic differences.*

Group	Key themes	Characteristic linguistic markers	Orientation in time
A (high)	danger, loss, control, fear	"afraid", "loss", "risk", frequent pronouns "I"	past/present
B (medium)	uncertainty, anxiety, adaptation	"worried", "experiencing", "trying", balance of negative/ positive	present/future
C (low)	plans, development, stability, security	"planning", "will", "opportunity", positive vocabulary	future

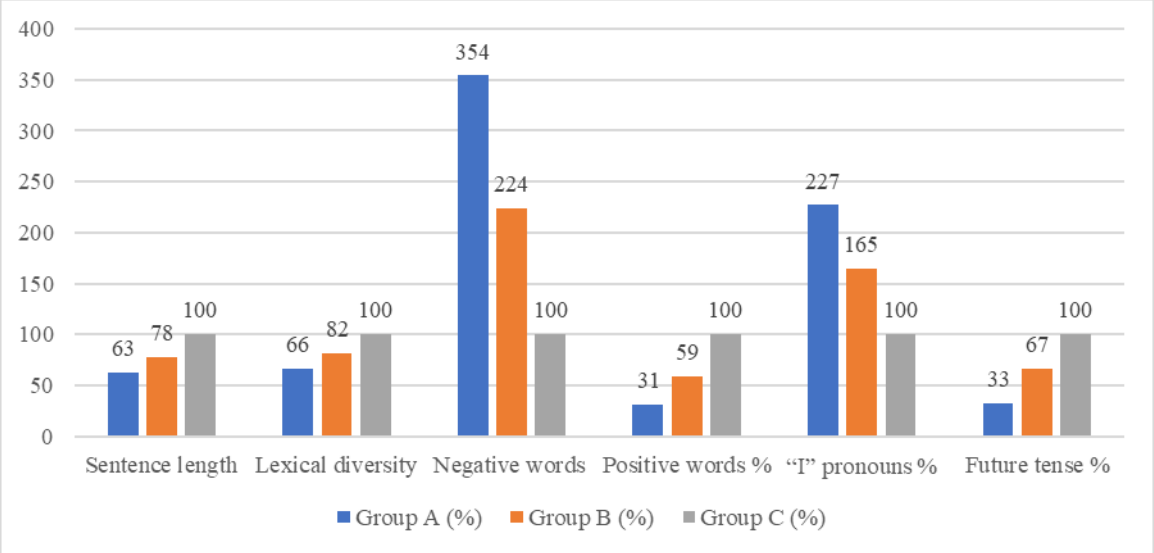

Figure 1. *Integrated linguistic profile of a highly anxious individual.*

and a higher frequency of negative emotional vocabulary. The control group (low anxiety) shows the opposite trends. At the same time, a comparative analysis (ANOVA with Tukey's post-hoc test) showed statistically significant differences between all three groups in the main speech characteristics. In particular, with regard to sentence length, participants with high anxiety formed short, often incomplete or grammatically simple constructions (M = 9.8 words), while participants with low anxiety had more complex and elaborate statements (M = 15.6 words). In addition, in group A, the percentage of negative vocabulary was almost 3.5 times higher than in the control group (14.5% vs. 4.1%). Use of "I" pronouns: in group A, their frequency was twice as high as in group C, which may indicate increased self-focus and egocentricity in experiencing anxiety states. Thus, correlations were performed to identify relationships between anxiety levels (total STAI and BAI scores) and language characteristics (Table 2).

Increased anxiety levels are associated with more negative vocabulary and self-referential statements, as well as shorter sentence lengths and lower lexical diversity.

To test predictors of anxiety, the authors formed a multivariate regression model in which the key dependent variable was the overall BAI score. All language characteristics were included in the model.

The model explained about 48% of the variance in anxiety scores. The strongest predictors were the frequency of negative vocabulary, low lexical diversity, and increased self-reference ("I").

The analysis of interviews and essays allowed us to identify a number of thematic and cognitive features. In group A, the dominance of themes related to danger, uncertainty, and loss was noticeable; frequent metaphors of fear ("like in a dark tunnel," "there is no way out") and orientation to the past ("the worst has already happened," "it will happen again"). At the same time, in Group B, the balance between negative and neutral themes, as well as the periodic use of resource images ("I will cope," "I will find a way out"), was noticeable. In group C, the themes of the future and development ("plans," "opportunities," "goals") and the predominance of positive or neutral vocabulary were noticeable. In addition, participants used complex syntactic constructions, rich metaphors with positive connotations.

The results of the linguistic analysis indicate clear differences between the groups in terms of anxiety levels. Participants with high anxiety (group A) mainly used short, fragmented sentences with a predominance of negatively colored vocabulary ("fear", "risk", "loss") and a focus on past experiences or potential threats. Group B is characterized by a certain balance - although the statements contain signs of anxiety, at the same time there are attempts to rationalize the situation and find ways to overcome difficulties ("trying to switch", "finding strength"). In contrast, participants with low anxiety levels (group C) demonstrated structured, optimistic statements with an orientation to the future ("planning", "wanting to achieve"). Based on these components, an integrated profile of a highly anxious person can be formed, which allows the cognitive-emotional state by linguistic features (See Figure 1).

As shown in Figure 1, the most noticeable are the reduction in average sentence length and the increase in the frequency of use of the pronoun "I" and negative vocabulary in highly anxious participants compared to the control group. These trends reflect cognitive limitations and a focus on one's own experiences under the influence of anxiety. At the same time, a decrease in

the proportion of verbs in the future tense indicates an avoidance of planning and a fixation on present or past experiences. Thus, as the integrated linguistic profile in Figure 1 shows, an increase in the level of anxiety is accompanied by a narrowing of the linguistic range, an increase in the proportion of self-referential and negative words, which can be used as a marker of emotional tension in psychotherapy practice.

Discussion.

This study was aimed at identifying patterns between the characteristics of patients' speech and the level of their anxiety and forming recommendations for the use of psycholinguistic methods in the therapy of anxiety states. Thus, the results showed that psycholinguistic analysis can be a reliable indicator of the level of anxiety and serve as a diagnostic marker in modern psychotherapeutic practice.

As indicated in modern works, one of the main tasks of modern psychotherapy is the development of methods that will allow individualizing interventions and increasing the effectiveness of treating anxiety states [21,22]. The results of this study showed that patients' speech contains important information about their internal state. In particular, the language characteristics established in the study (short sentence length, low lexical diversity, increased frequency of negative words and pronouns "I" can serve as indicators of a high level of anxiety. In this way, the psychotherapist can use these markers for an operational assessment of the level of anxiety without the need to use long questionnaires [23,24]. In particular, short, fragmentary sentences with frequent use of the words "fear", "anxiety", "loss" can signal the dominance of negative cognitive schemes and the need to use cognitive-behavioral or exposure techniques. Similar data were obtained in studies by other authors, who indicated that anxious and depressed individuals are prone to simplified syntactic structure in written texts [25-27]. At the same time, short sentences in the speech of highly anxious patients showed increased cognitive tension and focus on internal experiences, which confirms the ideas of cognitive-behavioral models of anxiety [28,29]. Therefore, psycholinguistic methods can act as an additional, valid diagnostic tool.

Psycholinguistic data made it possible to plan therapeutic strategies according to individual speech profiles. For highly anxious patients (Group A), an emphasis on negative cognitive schemes was noticeable through the awareness of repetitive speech patterns and the use of reframing techniques that replace negative images (“danger”, “loss”) with more constructive ones (“opportunity”, “control”). In this way, as proven in other works, it is worth working on expanding the vocabulary and syntactic complexity of statements, which affect the reduction of cognitive limitations and increase psychological flexibility [30-32]. For moderately anxious patients, the highlighted linguistic aspects can help the therapist emphasize the patient's resource aspects that can be relied on in therapy. Linguistic markers will make it possible to identify moments when the patient independently compensates for anxiety and use these moments to form effective self-regulation strategies [21,33]. For low-anxious patients, psycholinguistic analysis will confirm the stability of positive cognitive patterns and allows for brief maintenance and consolidation of resources, without intensive interventions. Similar observations are described in other works, which show that egocentricity in speech correlates with internal anxiety and self-focus [34-36]. In addition, other works have similarly proven that the use of negative words reflects emotional stress and a tendency to catastrophize. Thus, the results of this study indicated and confirmed the general patterns known in psycholinguistic and psychological studies of anxiety. The integrated profile of a highly anxious person, which the authors of this article constructed, is consistent with international data. This increases its scientific validity. In addition, comparison with other studies indicated that language markers can be used as universal indicators of anxiety in therapeutic practices.

Therefore, even though the article will provide valuable information regarding language markers of anxiety and their application in psychotherapy, there are certain limitations. In particular, the study was conducted on a sample of 160 participants, which limits the possibility of generalizing the results to the entire population. In addition, it is worth recognizing that the sample was stratified by the level of anxiety, but a significant number of demographic and sociocultural factors (age, profession or educational level) were not considered. These factors could also have affected the participants' speech and their cognitive strategies.

However, the results obtained allowed us to recommend several practical approaches. Monitoring the dynamics of speech is important. For example, regular analysis of the patient's oral and written statements will help to track changes in the level of anxiety during therapy. It is also worth integrating psycholinguistic exercises. Written essays, diaries, oral stories can be used as therapeutic tools for correcting cognitive schemes. Thus, the practical conclusions of the study indicated that the patient's speech is a source of valuable information about his anxiety and internal experience. In addition, the use of speech markers in combination with traditional assessment methods (STAI, BAI) will allow creating individual intervention programs and improving the quality of psychotherapeutic care. Furthermore, variables such as education level, age, and occupational field may independently influence lexical diversity, vocabulary, and syntactic complexity of utterances, independent of anxiety level. Future studies should consider these demographics as covariates to more accurately model the relationship between language characteristics and emotional state.

Conclusion.

Thus, the article identifies the main speech characteristics that are markers of anxiety. It is indicated that Participants with a high level of anxiety demonstrate short sentences, low lexical diversity, frequent use of “I” pronouns and a high percentage of negative words, as well as rare use of future tense forms. Correlation and regression analysis showed that speech indicators are statistically significantly associated with the level of anxiety (STAI, BAI).

The integrated speech profile of a highly anxious person includes short sentences, frequent “I” pronouns, a high percentage of negative words and low future orientation. Such a profile can serve as an operational diagnostic tool and the basis for individualizing psychotherapeutic interventions. This formed speech profile of anxiety can be used by psychotherapists,

psychologists and cognitive trainers to quickly assess the level of anxiety and monitor the effectiveness of therapy. In addition, the model can be integrated into online platforms for self-analysis of patients' texts, which expands access to psychotherapeutic support.

Future research should be devoted to expanding the sample and including more diverse sociocultural groups to increase the external validity of the model. In addition, an important direction is the development of automated psycholinguistic analysis tools that can detect markers of anxiety in real time.

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Conflicts of interest.

All authors declare no conflict of interest.

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