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СТОРІНКА ЛАБОРАТОРІЇ
ПРИХОВАНИХ МЕДІАЕФЕКТІВ

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Methodological Approaches to Studying the Functions of Musical News Intros

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This article presents a methodological approach to studying the functions of musical news intros on the radio, with a particular focus on their communicative role. It introduces and tests an innovative method that examines correlations between physiological responses – skin conductance, heart rate variability, and pulse rate – and exposure to musical news intros among young adults aged 20–26. **Methods**. A literature review was conducted to identify existing methodological approaches to the study of musical intros. The analysis involved selecting relevant sources, classifying the findings, and synthesizing them to assess how methodological issues are reflected in the current body of research. **Results**. The analysis reveals a lack of established and empirically tested methodologies specifically aimed at exploring the functions of musical intros, especially their communicative function. The study proposes an original methodological framework that employs electrophysiological techniques to uncover latent media effects induced by musical news intros – effects that may not be consciously recognized by study participants. **Conclusions**. The proposed approach offers a tool for assessing the effectiveness of musical news intros in influencing audiences. Overall, functional analysis facilitates an understanding of how intros fulfill their roles in the media and provides a basis for optimizing them to enhance their communicative impact on listeners and viewers.

Keywords: musical news intros; communication function; functional analysis; electrodermal activity; heart rate variability; pulse rate; psychophysiological methods; correlation analysis; hidden media effects; radio journalism; musical design; psychoacoustic impact; experimental methodology

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Методологічні підходи до вивчення функцій музичних новинних заставок

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Стаття присвячена описові методичних підходів до вивчення функцій музичних новинних заставок на радіо. У цій статті продемонстровано також апробацію нового методичного підходу до вивчення комунікаційної функції заставок методом кореляції показників електропірності шкіри, варіабельності серцевого ритму та пульсу у молодих людей у віці 20-26 років з музичними новинними заставками. **Метод**. Було проведено аналіз наукових джерел, в яких висвітлювалися методичні підходи до вивчення музичних заставок. Для формулювання висновків щодо відображення у науковій літературі питання методичних підходів застосовувався аналіз обраних джерел, класифікація результатів аналізу та їх узагальнення. **Результати**. Аналіз доступних наукових джерел засвідчує, що не існує спеціальної апробованої та описаної методики для дослідження функцій заставок, зокрема власне комунікаційної функції. Запропонована у статті методика дослідження є оригінальною і вимагає апробації. Метою застосування методики кореляції є визначення порядку проведення досліджень із використанням електрофізіологічних методів для вивчення прихованих функцій музичних новинних заставок у вигляді неконтрольованих суб'єктами дослідження медіаефектів. **Висновки**. Запропонована методика дозволяє зрозуміти ефективність музичних новинних заставок у впливі на аудиторію. У цілому функціональний аналіз допомагає визначити, наскільки ефективно заставки виконують свої функції у медіа та дає змогу оптимізувати їх для підвищення впливу на слухачів і глядачів.

Ключові слова: музичні новинні заставки; комунікаційна функція; функціональний аналіз; електрошкірна активність; варіабельність серцевого ритму; пульс; психофізіологічні методи; кореляційний аналіз; приховані медіаефекти; радіожурналістика; музичне оформлення; психоакустичний вплив; експериментальна методологія

The proposed article was carried out within the research framework at the Department of Film and Television Arts at the Educational and Scientific Institute of Journalism of Taras Shevchenko National University of Kyiv "Audiovisual Media and Arts as the basis of Contemporary Screen Communication and Culture" (state registration number 0124U001435). The departmental topic is devoted to the study of the strategy of functioning of audiovisual media and arts as effective tools of screen communication and culture; *functional*, species, typological, format, genre concepts and current trends in the development of the industry. The expected results should be the components of audiovisual media and arts. In this context of the requirements for the research work of the department, the study of the functions of such a component as musical news intros (MNI) is natural and is included in the dissertation research[40].

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The functionality of any media elements, or components, is an interesting category from both a theoretical and methodological point of view.

The essence of examining the functionality of any media tool is to understand its capabilities, limitations, and ways of using it to achieve a specific communication goal. This includes:

1. **Analysis of the principle of action** – how the tool works, what mechanisms or algorithms underlie it.
2. **Determination of the main functions** – what exactly it can perform and what its key capabilities are.
3. **Assessment of limitations** – what are the limits of use, in which conditions it works effectively and in which it does not.
4. **Practical application** – testing the tool in different scenarios to understand its effectiveness.
5. **Optimization of use** – finding the most effective ways of using it to achieve maximum benefit.

Studying functionality allows you to use the tool more rationally, increase productivity, and avoid errors in its application.

You can read about functionality in the field of media and society in the following works, e.g.:

• **"Theory of Media and Society"** – a textbook by Nina Zrazhevska, which examines the main theoretical concepts that connect society with the media sphere. The book analyzes methods, theories of media research, as well as the relationship between the development of society and the role of the media in socio-cultural dynamics (Зражевська, 2022).

• **"The Reality of Mass Media"** - a work by German sociologist Niklas Luhmann, which examines mass media from the perspective of a systemic approach. The author analyzes how media shape our perception of reality and influence society (Луман, 2010).

• **"Sociology of Public Opinion and Mass Media"** – a course of lectures that orients students to the main concepts, problems and theories in the field of sociology of public opinion and mass media. The functions of mass communication, effects and manipulative potential of mass media are considered (Єнін, 2021).

• **"The role of media in the formation of political and legal consciousness of the individual"** – an article by Lyudmila Nikonenko, which analyzes strategies for influencing and manipulating the consciousness of media users. Techniques and means of influencing the cognitive, emotional and motivational components of consciousness are highlighted (Никоненко, 2015).

There are no works dedicated specifically to the study of the functionality of MNI, however, this issue is partially raised in various works (Лизанчук, 2006; Любченко, 2016; Фомиця, 2019; 2020). Thus, in the article by S.M. Serbin, the use of musical intros, jingles and sound effects in radio broadcasting, their functional purpose and impact on the general atmosphere of the program are discussed (Сербін, 2013).

Qualification works of students have been recorded, in which the issue of musical intros is raised. In particular, in his study L. A. Naumenko analyzes the use of musical intros, jingles, and background music using the example of the radio stations "Ukrainian Radio" and "Bayraktar". This study considers the role of musical elements in the structure of the radio broadcast and their impact on audience perception (Науменко, 2023).

In addition, research on the formatting of radio broadcasts often touches on the topic of musical intros and jingles. E.g., the work of T. Rahimov examines the role of musical elements in radio station programming and their influence on the formation of the sound image of the broadcast (Рагімов, 2022).

Among the foreign research that partially address the issue of the functionality of MNI, we should mention:

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• "The Sonic Color Line: Race and the Cultural Politics of Listening" (2016) by Jennifer Lynn Stoever. This book explores how sound elements, including musical interludes, influence perception and identity in media (Stoever, 2016).

• "Auditive Medienkulturen: Techniken des Hörens und Praktiken der Klanggestaltung" (2014) edited by Axel Volmar and Jens Schröter. This collection of articles examines aural media cultures, including the use of musical elements in radio and television (Volmar, 2014).

The purpose of our study is to describe and develop methodological approaches to studying the functions of the MNI. In general, a function is understood as "a way of realizing the capabilities of a thing or an element of a system, aimed at achieving a certain effect" (ВУЕ, 2025b). Accordingly, functional analysis should be understood as

> a general scientific method that consists in determining the system-forming dependencies and functions of the studied object and their impact on other objects (systems, environment). The components of functional analysis are: identifying the range and content of the functions performed; mechanisms for implementing functions; conditions and factors for their adequate implementation; evolution of the functions and functionality of the object over time; consequences of the object's functioning in the system; causes and dangers of dysfunctionality; changes that occur in the object itself during the implementation of functions; search for functional equivalents, etc. (ВУЕ, 2025a).

Thus, *functional analysis* is a research method that identifies the role and significance of a certain phenomenon (in our case, musical intros) in the overall structure of the system in which it is used. In the context of musical news intros, this method helps to determine their functionality in media products, as well as their impact on audience perception.

When it comes to communication phenomena, such as media, their elements, we must understand that the main, only defining and main, natural function is the function of ensuring communication, communication in the form of media influence on the audience and the person. All other functions are dependent, subordinate to the main one. Thus, we can distinguish the main aspects of the functional analysis of musical intros:

1. Analysis of the actual communication function from different points of view (e.g., brand identification – determining the role of musical intros in creating brand recognition (of a news program, radio station, TV channel); psychological impact – assessing how a musical intro affects the audience's emotional state and cognitive perception of content, creating an atmosphere and forming expectations; neurophysiological impact – assessing the hidden and conscious impact on human behavior and physiological processes).

2. Structural analysis (assessment of how musical intros are integrated into the overall composition of a media product (news release, TV show, radio program), what structural role they play in this, and how the structural functions of the MNI affect the main, communication function).

3. System analysis (assessment of what role musical intros play depending on their type, appearance, form).

4. Cultural and historical analysis (analysis of the evolution of musical intros in different historical periods of media functioning and their significance in specific cultural contexts).

Method

The study of methodological approaches to the study of the functions of the MNI includes a review of the literature devoted to this issue. To search for sources, the electronic catalogs of the M. Maksymovych Scientific Library of the Taras Shevchenko National University of Kyiv, the V.I. Vernadsky National Library of Ukraine, the Scopus, ScienceDirect, Web of Science databases, and open access electronic resources were used. The following search queries were used:

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musical intro for radio news
music jingles for radio news
music in radio news
musical intro for breaking news
music jingles for breaking news
music in breaking news
research on music in radio news
research on music jingles for radio news
research on musical intro for radio news
research on music in breaking news
research on musical intro for breaking news
research on musical intro for breaking news
musical intro for breaking news
musical jingles for radio news
music in radio news
research on music in radio news
research on music jingles for radio news
research on musical intro for radio news

One of the effective modern methods of searching for scientific sources is the use of "artificial intelligence" tools. We used the ChatGPT4o tool. This method is productive but requires mandatory verification of search results. The positive thing is that AI not only suggests a source with links to search for it but also generates a short summary of the source. However, it is still the reference that should be checked.

To draw conclusions about how methodological approaches to the study of the functions of musical news intros (MNIs) are reflected in the scientific literature, the analysis involved the selection of relevant sources, classification of the findings, and their subsequent generalization.

This article also demonstrates the testing of a new methodological approach to studying the communication function of MNI, which has not yet been described in the scientific literature, and therefore, obviously, has not been used anywhere and by anyone before. We are talking about the study of hidden, unconscious media effects obtained from MNI at the level of their perception by listeners. In fact, the *method of correlation of neurophysiological indicators of research subjects with elements of media phenomena*[41] was used, in our case MNI. This method is presented by the Laboratory of Hidden Media Effects of the Department of Social Communications at the Educational and Scientific Institute of Journalism of Taras Shevchenko National University of Kyiv[42]. This article describes the approaches to first testing of this method.

Results and discussion

An analysis of the scientific sources cited in the reference list supports our initial assumption: there is no established or officially approved methodology specifically designed to study the functions of musical news intros (MNIs), particularly their communicative function. Given that this article proposes and tests a new methodological approach for investigating the communicative role of MNIs, we focus on identifying any methodological references in the existing literature that address sound or musical phenomena in media, including news intros.

Relevant insights can be drawn from research examining the influence of sound – especially musical background – on text perception via handheld devices. Notably, Kallinen's studies

[41] http://labs.journ.univ.kiev.ua/hmel/методи-дослідження/
[42] http://labs.journ.univ.kiev.ua/hmel/

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(September 2002; July 2004) explored these dynamics using a field experiment rather than a laboratory setting to enhance ecological validity. The author admits:

> to test hypotheses, a field experiment was preferred over a laboratory experiment in order to involve these aspects of the user's real environment and to obtain ecological validity. The influence of music on reading was studied in a noisy cafeteria (Kallinen, 2002).

This methodological approach emphasized replicating real-world conditions of auditory perception, using background noise – particularly musical elements – as a variable affecting cognitive and emotional processing.

In another paper, Kallinen notes:

> We investigated personality-related differences in people's emotional and other responses to news reports with slow or fast speech tempo and a background musical melody that increases or decreases. Personality was measured using the Behavioral Inhibition System (BIS)/Behavioral Activation System (BAS) scales and the Zuckerman–Kullman Personality Questionnaire. The physiological parameters studied were electrodermal activity (EDA), pulse propagation time, and beat-to-beat intervals (Kallinen, July 2004).

Thus, there is a methodological approach to studying the influence of background music during news reporting on its perception. This approach involves, in particular, the use of the electrodermal activity method (Turpin, 2007, pp. 899–902). In fact, our method of correlating neurophysiological indicators with elements of such media phenomena as MNI is also based on this approach.

The scientific work of the Ukrainian researcher Fomytsia (Фомиця, 2019; 2020), on psychoacoustic influence on mass consciousness in the socio-communication system of society, is noteworthy. In the scientific article "Musical design of news television and radio programs as a means of influencing the masses", which is directly related to the topic of our study, the author notes that

> the scientific novelty lies in the fact that for the first time the nature of the musical design of news releases of domestic and foreign television and radio programs is analyzed, in particular, the features of the design of announcements and breaks between news topics from the point of view of influencing mass consciousness (Фомиця, 2019, p. 14).

In this context, we are interested in research methods.

> To analyze the musical accompaniment used in television and radio programs, the monitoring method was applied in combination with observation and content analysis. The content is analyzed from three different positions: 1) from the point of view of psychoacoustics, 2) from the position of the technical capabilities of modern sound engineering, 3) as a means of influencing the masses (Фомиця, 2019, p. 14).

The third position is directly related to the study of the communication function of musical accompaniment, of which MNI is undoubtedly a part. The communication function of MNI has the form of psychoacoustic influence, which, according to Fomytsia, is a purposeful activity

> in the system of manipulative and propaganda technologies using sound techniques to influence the consciousness of an individual, a group of people and the population as a whole, which is carried out by changing the pitch, timbre, loudness, voice intonation, speech tempo, etc. in order to make changes in the behavior and worldview of the individual and the masses (Фомиця, 2020, p. 6).

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However, there is a problem with the scientific literature that analyzes psychoacoustic impact. The author notes:

> The analysis of the available historiographical base has shown a wide interest of scientists in the issues of psychoacoustics. However, we have not recorded any scientific studies in which the specified topic would be correlated with the media industry, journalism and social communications – there are only works of a tangential direction. As an independent problem, psychoacoustic impact on mass consciousness in the socio-communication system of society has not been studied, there are no historiographical traditions in national journalism and social communications (Фомиця, 2020, p. 7).

Due to the lack of such literature, it is difficult to find a description of the methods for studying these phenomena. Fomytsia himself focused mainly on the study of the typology of sound design of news programs, using spectral analysis and the construction of oscillograms of radio station call signs. Actually, the impact is considered through predicting the nature of the impact of sound types on the masses.

Researcher Liubchenko (2016) also focuses on the study of the communication function of expressive means, including musical ones, in radio journalism. The third section of the monograph "Expressive System of Radio Journalism" "Cognitive Aspect of Expressive Means of Radio Journalism: Focus Group Study" demonstrates the methodological approach chosen by the author to study the means of activating cognitive processes. The experiment used the focus group method and survey. An interesting fact of the analysis of the results of the experimental study is the ranking of factors of activating attention when listening to radio news. Thus, among the factors of activating attention when listening to radio news, musical accompaniment ranks 6 out of 9 (Любченко, 2016, p. 128). When ranking the factors of memorability when listening to radio news, musical accompaniment ranks 4 (Любченко, 2016, p. 135).

And in general,

> the results obtained during the focus groups made it possible to determine the features of information assimilation by ear, the influence of expressive means of radio journalism on the cognitive processes of the audience, and other factors involved in such mental processes as: sensation, perception, attention, memory, imagination, and thinking. In addition, the experiment made it possible to identify the main trends in the nature of assimilation of both the airwaves in general and individual types of radio broadcasting (Любченко, 2016, p. 146).

In this article, we propose a different methodological approach to studying the communication function of sound phenomena in the media environment – musical accompaniment, intros, interruptions, etc. In our opinion, both focus group work and surveys are quite applicable methods, but the results of experiments using these methods are marked by the subjectivity of the data, which lies in the individualized interpretation by the participants of the experiment as listeners of the nature of the influence of musical design on cognitive processes while listening to the radio. As Liubchenko herself notes,

> the study on identifying the features of the development of cognitive processes while listening to the radio, conducted by us, involves a qualitative approach, when the primary ones are the subjective opinions of people, expressed when the attitude of the research subject is presented as the subjective value of the object for the individual, taking into account his experience. This is crucial when studying the individual auditory perception of information, the life experience of each participant in the experiment, and identifying subjective factors influencing the cognitive processes of listeners (Любченко, 2016, pp. 110–111).

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In the case of searching for results independent of the participants in the experiment, it is worth applying a different methodological approach that does not involve analyzing the participants' statements, but is based on the listeners' unconscious and uncontrolled reactions to musical content.

The proposed methodological approach involves the use of the method described in the Laboratory of Hidden Media Effects of the Department of Social Communications of the Taras Shevchenko National University of Kyiv for the correlation of neurophysiological indicators of research subjects with elements of media phenomena (В. Різун, 2025). Based on this invariant method, a method for correlating skin electrical resistance, heart rate variability and pulse in young people with musical news intros was proposed (А. Різун, 2025).

The purpose of applying the method for correlating skin electrical resistance, heart rate variability and pulse in young people aged 20–26 with musical news intros is to determine the procedure for conducting research using electrophysiological methods to study the hidden functions of musical news intros in the form of media effects uncontrolled by the subjects of the study.

To conduct research using this method, permission is required from the Committee on Bioethics of Scientific Research at the Taras Shevchenko National University of Kyiv.

The recommended number of subjects for the control and experimental groups is initially 30–35 people for each group.

Before the study using this method, a preliminary examination of the research subjects is organized, since no surveys are carried out by the researcher during the experiment. Each healthy volunteer fills out an online questionnaire, and also undergoes online psychological testing aimed at determining the general condition of the volunteer (PSM-25) and his emotional state (level of depression) PHQ-9, GAD-7 (for screening for generalized anxiety disorder). Using the Spielberger-Hanin test, self-assessment of the level of anxiety at the moment (reactive anxiety as a state) is determined.

The criteria for inclusion/exclusion of subjects in/from the research group(s) are determined by methodological recommendations for the use of the research method, psychological tests, and by the researcher, for example, regarding the age, gender, and social status of the subjects. Subjects will be identified by the results of their questionnaire as potential research participants who have consented to participate in the study.

Those with severe mental disorders, who have 10 or more points on the PHQ-9 psychological tests, and 15 or more points on the GAD-7 psychological tests are not included in the study.

The course of the study is prescribed in the standard operating procedure for the study, recorded in the research protocol, which is part of the description of the methodology (А. Різун, 2025, p. 16).

The processing of the study results begins with an examination of the files of the participants' responses to the questionnaire and psychological tests. The purpose of the examination is to edit the response files to fill in the gaps, remove unnecessary marks, etc. At all stages of the results processing, the "Data Correlation Table_Shimmer" is filled in with the following column names:

ID
Sex (0 - m; 1 - f)
Age
PSM-25 total score
PHQ-9 total score
GAD-7 total score
Spielberger-Hanin total score
Average electrical resistivity for BBC radio MNI
Average electrical resistivity for Ukrainian radio MNI
Average electrical resistivity for Radio Liberty MNI

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Average electrical resistivity for Public radio MNI
Average heart rate variability for BBC radio MNI
Average heart rate variability for Ukrainian radio MNI
Average heart rate variability for Radio Liberty MNI
Average heart rate variability for Public radio MNI
Average pulse rate for BBC radio MNI
Average pulse rate for Ukrainian radio MNI
Average pulse rate for MNI Radio Svoboda
Average pulse rate for MNI Hromadske Radio
Correlation index(es) (at the researcher's choice)

After filling in the data correlation table, various types of correlation analysis are performed based on the tabular data. The corresponding results are placed in the column(s) of the table "Correlation index(es) (at the researcher's choice)".

The interpretation of the data in the correlation table is carried out in order to find out to what extent the indicators of psychological tests for each participant and on average for the group differ from the indicators of laboratory research: if, e.g., the tests indicate a state of excitement, and the MNI gives a result of calmness and tranquility or vice versa, then this will indicate the effectiveness of the MNI and their function.

The table below presents established interpretations of physiological indicators outside our research, which we consider as a material correlate of media effects and a consequence of the function of the communication influence of the MNI (Boucsein, 2012; Brosschot, 2007; Chalmers, 2014; Critchley, 2002, 2017; Dawson, 2007; Friedman, 2007; Kemp, 2013, 2010; Kim, 2018; Lehrer, 2014; Shaffer, 2017; Thayer, 2012, 2009):

Table 1.
Interpretation of physiological indicators

Functions	Electrical resistance indicators	Heart rate variability indicators	Pulse indicators
calm, relaxation, drowsiness, depression, fatigue, chronic stress	high resistance		
stress, excitement, fear, joy, anxiety, hypersensitivity	low resistance		
calm, emotional stability, lack of severe stress, high stress tolerance		high heart rate variability	
anxiety, depressive states, burnout, chronic stress, exhaustion, emotional overload, panic attacks		low heart rate variability	
stress, anxiety, overexcitation (emotional reaction), panic attack, overfatigue, chronic stress, depression with elevated cortisol levels,			high pulse

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PTSD (post-traumatic stress disorder)			
deep relaxation, calm, fatigue, apathy depressive states, exhaustion			low pulse

The lower the resistance, the greater the emotional or physiological arousal; the higher the resistance, the calmer the body's state.

The greater the rhythm variability, the better the body adapts to stress and environmental changes. Low variability may indicate a high level of stress, emotional exhaustion, or even mental disorders.

A high resting heart rate may indicate stress, anxiety, PTSD, or panic attacks. A low heart rate may be a sign of depression, emotional burnout. Sharp fluctuations in heart rate indicate autonomic dysfunction, nervous exhaustion, or severe stress.

In fact, based on the results of the preliminary examination of the subjects, as well as the results of the study, a dynamic socio-psychological portrait of the study participant was formed. The dynamics are associated with changes in the psychological states of the participants under the influence of MNI.

Conclusions

We propose to apply this method in research on radio and television broadcasting to understand the effectiveness of MNI in influencing the audience. In general, functional analysis helps to determine how effectively MNI perform their functions in the media and allows them to be optimized to increase their impact on listeners and viewers.

A review of the literature, along with discussions with participants involved in research on the functions of musical news intros (MNIs), allows us to propose a potentially debatable hypothesis: the conceptualization of the function of MNIs – and, more broadly, of any media elements – is grounded, on the one hand, in theoretical predictions regarding their nature, content, and functional effectiveness based on their construction, structure, and patterns of use, and on the other hand, in empirical studies examining their actual effects on individuals or groups. In this context, the analysis of musical works becomes essential, as it entails a detailed examination of structure, harmony, melody, rhythm, and other compositional elements to understand how these features contribute to mood creation or information transmission. Musical analysis, as a research method, aims to investigate how such formal characteristics influence audience perception and emotional response, particularly within specific media contexts. For instance, harmonic analysis examines chord progressions that evoke certain emotional responses in listeners. It is often suggested – though further research is needed – that major chords are frequently used in news intros due to their association with neutrality and authority, thereby enhancing the perceived credibility and stability of the news content.

But from the point of view of melodic analysis, the short, sharp, and ascending motifs in the MNI indicate the dynamics and importance of the information.

From the point of view of rhythmic analysis, a fast tempo (~120 BPM (Beats Per Minute) and above) is considered to give energy, while a slower tempo (~60–80 BPM) can induce calmness. Timbre analysis, related to the assessment of the sound of instruments in news jingles (orchestral accompaniment, synthesizers, drums), gives reason to believe that many news jingles use brass instruments (trumpets, horns) to create a solemn and serious sound. Dynamic analysis of the MNI, when it comes to assessing the loudness and contrasts in the sound of a musical intros, leads to the conclusion that sudden changes in loudness can increase the attention of listeners. But all this requires an experimental evidence base.

The cultural approach to the analysis of musical intros is interesting as a research method that analyzes musical intros in the context of cultural, historical and social traditions. It helps understand how the music in news intros reflects certain values, identities, traditions and cultural codes within a

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particular society or media environment. E.g., in the USSR and the USA in the 1950s–1970s, orchestral fanfares were used to give officiality to news, while in the 2000s, electronic motifs began to dominate.

Regarding the national specificity of musical intros, there is evidence that, e.g., neutral synthetic textures are preferred in Europe, orchestral fanfares in the USA, and melodic electronic motifs in Japan.

In terms of political and ideological influence, it is believed that in authoritarian states, news jingles often sound solemn, emphasizing the importance of official information, while in democratic societies the emphasis is on dynamism and openness.

Indeed, some ideas need confirmation in the form of facts obtained through this study. We have proposed a methodological approach based on experimental data.

Authors' contribution: Arsen Rizun – writing the text, developing the methodology; Inna Bielinska – developing approaches to testing the methodology, selecting psychological tests.

Declaration of Generative Artificial Intelligence and Technologies Using Artificial Intelligence in the Writing Process.

During the preparation of this article, the authors used ChatGPT4o to search for scientific sources. After using this tool, the authors checked and analyzed the suggested sources. The AI Assistant tool integrated into Adobe Acrobat Online was also used to analyze the content of the sources. The authors of the article bear full responsibility for the correct use and citation of sources.

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