

Emotional Landscapes of Cultural Identity in Fanzines: The Power of Modern Computing in Enhancing Humanities Research

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Abstract. This study investigates the application of computational methods in analyzing subcultural identity within Lithuania's metal music community, as expressed in fanzines. Following Lithuania's 1991 independence, fanzines became significant platforms for alternative youth culture. The research employs a mixed-methods approach, combining computational techniques with qualitative analysis to examine over 50 fanzine issues. Sentiment analysis and topic modeling reveal a complex emotional landscape within fanzine texts, characterized by strong polarity and deep connections to the music. Key findings include the identification of dominant themes centered on bands, albums, and death metal, as well as evidence of *semantic inversion* in expressing subcultural identity. The study demonstrates how linguistic expressions in fanzines reflect resistance against social norms, supporting the concept of cultural rebellion in the metal subculture. By integrating quantitative and qualitative approaches, this research offers novel insights into subcultural identity formation and suggests the potential for developing subculture-specific emotional dictionaries for future studies.

Keywords: fanzines, metal music, subcultural identity, computational methods, emotion analysis, digital humanities

1. Introduction

Fanzines often called the informal press, are integral to alternative youth culture, representing self-published, DIY-style magazines that have been recognized globally since the 1970s. In Lithuania, fanzines gained significant popularity after the country regained its independence in 1991, reaching their peak between 1992 and 1998. These publications are precious for studying subcultural identity, as they reveal the authors' values, worldviews, and interactions with a changing social environment. This research focuses on fanzines from the metal music subculture collected as part of a fanzine digitization project (<https://jauka.knf.vu.lt>). The collection includes over 550 issues, encompassing various genres such as punk, metal, football fan, and others, with a substantial number dedicated to metal music. Fifty English-written metal music fanzines were used for this research.

1.1. Connectedness to Subcultural Studies

This research focuses on subcultural identity, a system of values individuals create while communicating within themselves and their social environment (Cohen, 1993; Hebdige, 1979; Williams, 2011). Researchers typically apply qualitative methods when studying subcultural identity, utilizing various data sources, including interviews, fieldwork materials, letters, diaries, and creative artifacts. Fanzines serve as significant sources where subcultural identity manifests.

Our study relates to sociolinguistic research emphasizing linguistic variations arising from communication among participants of different societal groups (e.g., Cheshire, 1982; Eckert, 2000; Labov, 1966). However, it is more directly linked to subcultural studies, a field developed by researchers at the Centre for Contemporary Cultural Studies (CCCS) at the University of Birmingham.

The CCCS approach explains the homology between the values and lifestyle created by subculture members by examining how these reflect their sociocultural surroundings (Hall and Jefferson, 2006). This approach emphasizes resistance against social norms (Roszak, 1969), focusing on how subcultures share values and cultural practices that differ from the mainstream. It explores how deviant behavior emerges in response to the social environment (Becker, 1973; Clarke, 2006; Cohen, 1955) and how revolt against societal stereotypes can be expressed through style (Hebdige, 1979).

For example, in his analysis of punk style, Hebdige notes the homological relation "between the trashy cut-up clothes and spiky hair, the pogo and amphetamines, the spitting, the vomiting, the format of the fanzines, the insurrectionary poses and the 'soulless,' frantically driven music" (Hebdige, 1979, p. 137). This example illustrates how subcultures express their authenticity and resistant nature through characteristic philosophy, music, texts, clothing, images, and fanzines.

Our research contributes to the established tradition of examining fanzines from the late socialist and early post-socialist periods, spanning approximately 1985 to 1999. This work complements recent scholarly investigations into fanzine culture across various Eastern European countries, including the Czech Republic, Slovakia, Slovenia, Latvia (see Šima and Michela, 2020, pp. 1-16)¹, and Lithuania.

1.2. Research Objectives

While fanzines are a significant element of subcultural style, researchers typically analyze their emergence, spread, history, and ethnocultural uniqueness in different countries, as well as their structure and community-building functions (Forum Historiae, 2020). Our study focuses on an analysis of emotions in fanzine texts. This novel

¹ Researchers have conducted case studies on specific fanzines using materials from interviews with authors and readers. For example, Mahulena Kopecká (2020) examined the anarcho-feminist zine "Bloody Mary," while Jānis Daugavietis (2020) studied "Ot Vinta," a Russian-language music samizdat from the Latvian Soviet Socialist Republic. Other scholars have focused on broader phenomena within fanzine genres. These include studies on hardcore punk fanzine cultures (Almer, 2020), football fanzines (Lomíček, 2020), metal music fanzines (Liubiniene, 2009) and many others. Kairaitytė-Užupė (2024a) also analyzed the emergence and spread of youth fanzine genres in Lithuania.

approach substantiates the phenomenon of semantic inversion² in fanzine texts, which we associate with the resistant nature of subcultures.

The primary objectives of this study are:

1. To identify Lithuanian metal music fanzines' main topics and emotional content using computational methods and observations.
2. To explore how these emotions reflect and contribute to subcultural identity formation.

By examining the positive and negative emotions in the informal subcultural press, we seek to deepen our understanding of how subcultures communicate, express identity, and resist mainstream norms through fanzines.

1.3. The Relevance of Computational Methods in Analysing Subcultural Identity in Fanzines

Our study confirmed the consensus that computer methods can enhance understanding of cultural phenomena. We have found computational methods helpful in analyzing subcultural identity for several reasons. One reason relates to the vast scope of material. When analyzing fanzines, we encounter large volumes of text that are difficult to process using traditional anthropological methods alone. Computational analysis provides the advantage of data visualization, enabling the identification of trends within the data, a practice known as "distant reading" (Moretti, 2000) in digital humanities. What surprised us was the potential to uncover alternative approaches to identity that are not common in traditional anthropological research, offering new interpretations and raising new research questions.

Our research revealed that computational methods could help researchers quickly familiarize themselves with dominant topics in fanzines (topic analysis), detect prevailing positive and negative states (sentiment analysis), and identify specific emotions, such as joy, anger, or sadness (emotion analysis). Such analysis helps understand the emotional tone and attitudes expressed in texts, which is crucial for analyzing cultural identity.

Moreover, by combining computational analysis with traditional fieldwork (interviews and observations), we explored a broader context and identified the circumstances in which dominant emotions appear. This systematic integration of quantitative and qualitative methods significantly enhanced the validity of our interpretations.

Our research aligns with the growing field of digital humanities, which investigates how technology can be applied to analyze cultural artifacts (Gold, 2012; Lang and Ommer, 2021; Manovich, 2016).

² In cultural studies, the concept of 'semantic inversion' has been discussed as a rhetorical device used in the appropriation and transformation of slurs (Jacobs, 2002) and as a tactic employed in right-wing discourses to re-semanticize and re-code meanings, establishing new belief systems (Mackenthun and Dosch, 2023).

The paper presents the methodology applied to the research and corpus statistics, case study, results, conclusions, and future implications.

2. Methodology

This section outlines the methodological framework used to detect dominant features of subcultural identity in fanzine texts. We will explain each computational method and the tools employed, including the technical aspects of the analysis.

2.1. Preparation of Materials for Analysis

The digitalized metal music fanzines from the Jauka archive (<https://jauka.knf.vu.lt>) were used for the analysis. For our experiments, we used three levels of materials: a corpus consisting of all English-language metal music fanzines from the archive, sub-corpora grouped by fanzine titles, and individual fanzines. This multi-level approach provided a more detailed view of the data.

We focused on fanzines written in English to avoid complications associated with analyzing Lithuanian texts, as some tools we used (e.g., VADER) do not directly support the Lithuanian language. Optical Character Recognition (OCR) software was applied to convert these fanzines into plain text. However, the fanzines were produced using low-quality photocopiers in the 1990s, making it challenging to achieve high-quality OCR results. Consequently, reliable translations into English were not feasible. Machine translation could introduce potential inaccuracies due to OCR text recognition process errors.

To enhance the validity of the research, we applied appropriate preprocessing methods for each kind of analysis. We applied the Perplexity.AI model to review the content of the fanzines, conducted a word frequency analysis and topic modeling to determine themes, utilized sentiment analysis to reveal emotional characteristics of subcultural identity, and employed both distant and close reading methods to uncover a broader context.

The following sections provide a detailed description of the text analysis and processing methods used in our study.

2.2. Using Perplexity for Contextual Understanding

To gain a better contextual understanding of the fanzine content, we employed Perplexity, an AI-powered research and conversational search engine. Perplexity integrates large language models (LLMs) to generate answers and provide contextual summaries (<https://www.perplexity.ai>). While a detailed description of Perplexity AI methods is not available, it is known that the platform employs Natural Language Processing (NLP) algorithms and machine learning models to process and understand user queries. It is known that Perplexity can provide nuanced and context-aware answers. We submitted examples from each subset of a larger corpus, defined by fanzine titles, to Perplexity.AI via API calls and parsed the responses to identify key topics and emotional nuances within the respective fanzines.

It is essential to mention the limitations of this tool. While Perplexity excels at generating human-readable, conversational answers and summarizing content provided

to it, it may lack the granularity of specialized sentiment analysis tools or topic modeling techniques. Additionally, no known scientific studies have evaluated Perplexity.AI's accuracy for such tasks. Therefore, we used Perplexity.AI alongside other analytical methods to ensure the reliability of the analysis.

2.3. Word Frequency Analysis

Word frequency analysis involves calculating the occurrence of words in a text to identify the most common terms or themes. This method is based on the assumption that frequently used words (e.g., nouns, adjectives, and verbs) are likely associated with the main topics in the text. This analysis helped illuminate the subject matter of the fanzines.

2.4. Topic Modelling Using Latent Dirichlet Allocation

We used Latent Dirichlet Allocation (LDA) (Gross and Murthy, 2014) to identify underlying topics within the text. LDA is a Bayesian probabilistic model to identify the dominant topics in the text. It clusters words into topics based on their co-occurrence, providing insights into the thematic structure of the fanzines.

2.5. Sentiment Analysis Using VADER

One of the most important tasks in this study was sentiment analysis in the fanzines. Several Python-based packages, including VADER, TextBlob, and Flair, are available for this task. While a comprehensive evaluation of each package's suitability for fanzine analysis was beyond the scope of this study, we considered several factors in our selection process.

Accuracy was a primary consideration. Some studies, including comparisons in Kaggle competitions, pointed out that VADER (Valence Aware Dictionary and Sentiment Reasoner) has an advantage over other tools. Additionally, VADER's capability to handle colloquial language and slang made it particularly suitable for analyzing fanzine content.

VADER is a rule-based sentiment analysis tool optimized for social media text. It uses a specialized lexicon for sentiment analysis tasks and can efficiently handle informal communication without extensive data cleaning. VADER automatically manages several preprocessing tasks, including stop word removal, handling punctuation and capitalization, and recognizing emojis and emoticons. It also effectively interprets complex expressions involving negations and intensifiers (e.g., "not good" or "very bad") (Hutto and Gilbert, 2014).

While VADER has limitations in dealing with irony and sarcasm, these challenges are common to most traditional sentiment analysis techniques. We considered using machine learning algorithms to enhance VADER's capabilities but were constrained by the limited availability of labeled training data specific to youth subculture texts.

We examined the impact of OCR errors on sentiment analysis outcomes and experimented with text preprocessing. Although VADER's lexicon-based approach provides some resilience against typographical errors, we cleaned poorly recognized and nonsensical sentences, which accounted for 10 to 20 percent of the analyzed texts.

Comparing results from cleaned and uncleaned texts revealed minor differences in positive, negative, and neutral sentiment classifications. However, cleaning sometimes resulted in the loss of specific sentiments. Consequently, we relied on VADER's inherent capabilities to ensure textual coherence.

For the analysis, we divided the text into paragraphs of up to 2,500 characters, ensuring each paragraph ended with a complete sentence. This approach allowed us to maintain the contextual elements of fanzines while working within the technical constraints of the VADER tool, which performs optimally on shorter text passages.

2.6. Distant and Close Reading

Our methodology incorporated distant reading (Moretti, 2000) and close reading approaches. We used Python-based scripts to automate the distant reading process, leveraging libraries such as NLTK and spaCy for text processing.³ We employed data visualization libraries such as Matplotlib and Seaborn to represent sentiment distributions graphically and visualize the results. Close reading was used for in-depth analysis of specific sections or episodes within the fanzines, offering a detailed understanding of textual nuances and meanings.

Using close and distant reading increases the reliability of interpretations regarding cultural identity, particularly when analyzing textual data like fanzines. Distant reading provides a broad overview of large datasets, while close reading offers in-depth insights into specific sections. By combining computational techniques with traditional close reading methods, we better understood the emotional content in the fanzines, highlighting the potential of interdisciplinary approaches in digital humanities. Metal music identity was revealed when (a) evaluating the complexity and coherence of the text, (b) identifying the most common words and themes, (c) underlying topics when discovering the thematic structure using LDA, (d) analyzing the sentiments and the emotional tone, (e) making contextual insights when interpreting the results within the broader context of the fanzines. This multi-faceted approach allows for a deeper and more nuanced understanding of metal music identity as it appears in fanzine texts.

2.7. Corpus Statistics of Metal Music Fanzines

The metal music fanzines corpus comprises 55 documents, totaling 2,726,952 words and 14.7 MB of space in text files. With an average document length of around 50000 words, this extensive collection offers a rich and diverse representation of language used by the Lithuanian metal subculture fans from 1992 to 2004. This corpus is valuable for exploring metal music's themes, trends, and cultural significance in that era. For detailed statistics of document lengths, see Figure 1.

³ Python scripts used in this study were developed with assistance from the Perplexity AI language model (Perplexity, 2023).

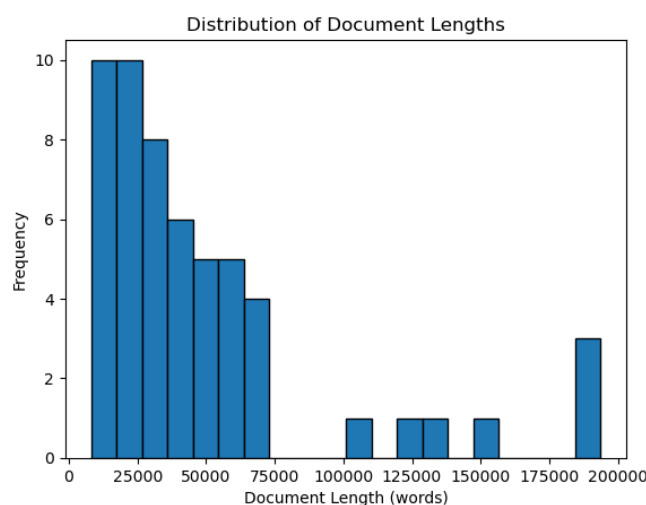


Figure 1. Distribution of document lengths

3. 3. Case Study: Exploring Subcultural Identity in Fanzine Texts

3.1. Context Understanding

A corpus of metal music fanzines focuses on music-related content, specifically reviews of albums and tracks and discussions, opinions, and critiques on various music topics. These fanzines include creative works by subcultural participants, such as essays, poems, and other artistic expressions.

Our dialogue with the Perplexity model revealed differences in insights from analyzing single fanzines versus collections of fanzines. Analysis of a single fanzine, like "Ledo_takas_08" (Table 1), yields detailed empirical information, including specific contributors, visual elements, and distribution details. In contrast, examining a sub-corpus, such as the collection of "Ledo_takas" issues (Table 2), provides more abstract and summarized insights, focusing on content types and analysis across multiple reviews.

This comparison suggests that single fanzine analysis aims to understand a fanzine's specific structure and content, potentially for historical or cultural analysis. Conversely, sub-corpus analysis is intended to describe a corpus's overall structure and content, more suitable for sentiment analysis and other computational studies.

Table 1. Overview of the Fanzine "Ledo Takas" No. 8

Category	Description
Content Variety	The fanzine covers topics related to the metal music scene, featuring bands like Avulsed, Babylon Whores, Darkthrone, Empyrium, and more. It includes articles, reviews, and interviews with contributors like Tadas Kazlauskas, Martin Kvam, Stephen O'Malley, and Yuri Arkadin. The content is a mix of music-related articles, reviews of albums and bands, and non-musical articles.
Visual Elements	It incorporates design and graphics by Lars Jamne from Oskorei, with front cover artwork by Aida Iruide and additional pictures by Aura and Aida.
Distribution and Availability	Various outlets across different countries distributed these fanzines. Back issues such as Ledo Takas #7 and Brainstorm #3 and #4 are still available.
Future Projections	The fanzine hints at the launch of a new magazine, Ad Arma, which will partially replace Ledo Takas. Ad Arma is a collaborative effort among Baltic States writers. There are local language editions, English versions, and worldwide distribution plans.
Editorial Approach	The fanzine is committed to improving each issue, aiming for perfection in its content and presentation. It seeks closer alignment with extreme bands in the metal scene, mainly focusing on those that incorporate spiritual music elements.
Additional Inclusions	Includes a compilation CD with known and upcoming bands. Mentions the availability of a mail-order service with a wide selection of titles, from well-known artists' CDs to underground demos and magazines.

Table 2. Overview of the Collection of Fanzines ("Ledo Takas" No. 4-8)

Category	Description
Content Overview	The collection includes discussions about music albums, tracks, performances, and musicians; it contains opinions, critiques, and evaluations of music-related aspects.

Category	Description
Sentiments and Opinions	Authors express sentiments about music albums and tracks' quality, performance, and impact. They also provide opinions on specific songs, albums, and musicians, highlighting positive and negative aspects.
Album Reviews	Authors discuss the content, themes, and production quality of specific albums. Mentions the recording dates, bonus tracks, and the overall impression of the albums.
Musical Analysis	The authors analyze the musical elements, such as lyrics, composition, and performance. Compares different tracks, albums, and musicians to view the music discussed comprehensively.
Comparisons and Recommendations	Publishers compare different tracks or albums to highlight strengths and weaknesses. They provide recommendations or critiques on specific songs or albums based on the author's perspective.
Structure	The text is structured in paragraphs discussing various aspects of music. It includes detailed descriptions, evaluations, and comparisons of different musical elements.

3.2. Communication with Perplexity

We experimented with various questions directed at the Perplexity model to understand how effectively it can assist in exploring the content of fanzines and emotions. After posing several questions, we asked the model to summarize which questions were most appropriate for sentiment analysis. The response was:

"To sum up our dialogue, the questions that would be most appropriate for sentiment analysis are those that delve into personal feelings, experiences, thoughts, and visions and inquire about the lyrical concepts and inspirations behind the music. These questions touch on emotional aspects and provide insights into the artist's creative process and emotional connection to their work, making them suitable for sentiment analysis."

We then asked Perplexity to identify the ten questions from our dialogue best suited for sentiment analysis of the corpus. The response from Perplexity included the following questions:

1. *What are the key themes or topics discussed in the text?*
2. *Can you identify any positive words or phrases in the text?*
3. *Are there any negative sentiments expressed in the corpus?*
4. *How would you describe the overall tone of the text based on the language used?*
5. *Do you notice any specific emotions conveyed throughout the text?*

6. Are there any recurring words or sentiments that stand out in the corpus?
7. Can you identify any instances of praise or criticism within the text?
8. How do you interpret the author's attitude towards the subjects discussed?
9. Are there any words or phrases that indicate a strong emotional response from the author?
10. Based on the language used, what conclusions can be drawn about the sentiment of the text as a whole?

By exploring these questions, we extracted valuable insights from the text. The fanzines convey enthusiasm, critical analysis, and a deep emotional connection to the music and bands discussed. There is a sense of appreciation for music projects and excitement about new album releases. The text also expresses admiration for musicians' dedication. However, criticism is also present, particularly regarding certain aspects of the music industry, such as commercialism and delays in recording dates. The text also reflects a nostalgic tone, reminiscing about past music eras and the evolution of music genres. Overall, the sentiments expressed in the metal music fanzines blend passion, critical reflection, and a deep connection to the music scene being discussed.

3.3. Dominant Topics in Fanzines

To test our initial insights, we developed the Python script to preprocess the fanzines corpus, analyze token frequencies, and visualize the results using bar plots and word clouds. The preprocessing involved converting text to lowercase, removing punctuation and numbers to ensure uniformity, tokenization (text splitting into individual words or tokens), stop word removal, and lemmatization (reducing words to their base or root forms for more accurate analysis). Following preprocessing, the most common tokens and their frequencies were extracted (Figure 2), leading to the generation of a word cloud based on these token frequencies (Figure 3).

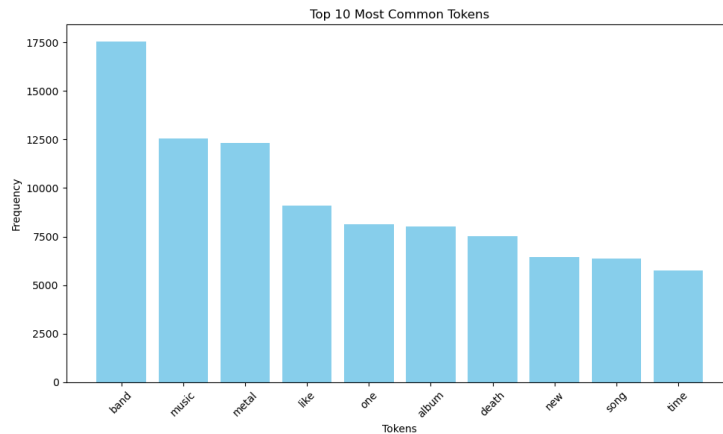


Figure 2. Top 10 Most Common Tokens and Their Frequencies

The bar plot in Figure 2 illustrates the top 10 most frequent tokens in the fanzines corpus and their corresponding occurrences. The visualization enables a quick comparison of these tokens' prevalence and is included for illustrative purposes only.

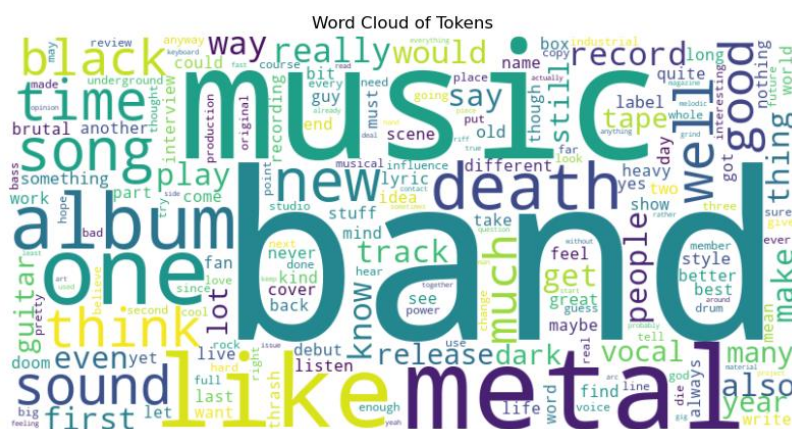


Figure 3. Word Cloud Representing Main Subjects of Metal Music Fanzines

This word cloud visually represents themes covered in metal music fanzines. The size of each word in the cloud corresponds to its frequency in the corpus, highlighting the most prominent themes and concepts discussed. This visualization allows for a quick overview of the main subjects that resonate within the fanzine content, providing insights into the interests and concerns of the metal music community.

Topic Modeling. A deeper analysis of the Metal Music Fanzines Collection (corpus) was conducted to identify the main topics in various subsets of fanzines (sub-corpora) and individual fanzines when relevant. We created a script designed to perform topic modeling using Latent Dirichlet Allocation (LDA) on the collection of metal music fanzines. The text was preprocessed (cleaned and tokenized) before the analysis. The number of topics was set to 3 since our previous experience (performed using experimental evaluation manually selecting different numbers of topics) suggested that setting $k=3$ was one of the best choices on a wide range of different types of texts and topics. In this study, some attempts to use different numbers of topics showed no crucial changes among the words seen as most important for topic modeling. The most important identified themes across fanzines were as follows:

- Topic 1: $0.013 \cdot \text{"metal"} + 0.011 \cdot \text{"music"} + 0.011 \cdot \text{"band"} + 0.008 \cdot \text{"one"} + 0.007 \cdot \text{"album"}$
- Topic 2: $0.015 \cdot \text{"band"} + 0.011 \cdot \text{"metal"} + 0.011 \cdot \text{"music"} + 0.011 \cdot \text{"album"} + 0.009 \cdot \text{"like"}$
- Topic 3: $0.026 \cdot \text{"band"} + 0.015 \cdot \text{"music"} + 0.013 \cdot \text{"metal"} + 0.011 \cdot \text{"like"} + 0.011 \cdot \text{"death"}$

When interpreting the topics identified by LDA, we consider the words most strongly associated with each topic and their relative weights. All three topics center around metal music and bands, indicating that these are core themes across the fanzines. Topics 1 and 2 include "album," suggesting that discussions about specific albums are common. The presence of "like" in Topics 2 and 3 indicates that the fanzines include subjective opinions or preferences about bands and albums. Topic 3's inclusion of

"death" suggests a focus on death metal, indicating that this subgenre is discussed within the fanzines. The plot of the topic distribution across fanzines corpus (Figure 4) illustrates how these topics are distributed among the sub-corpora of fanzines.

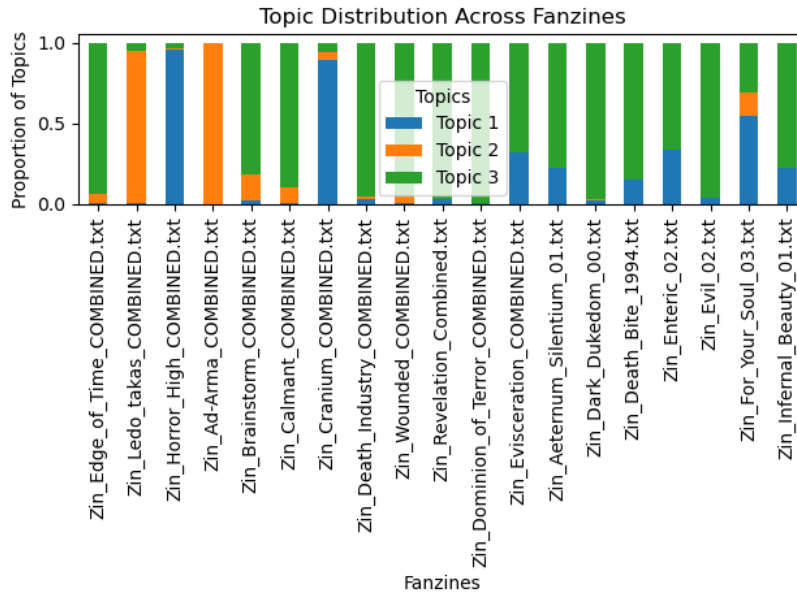


Figure 4. Topic Distribution Across Fanzines

The results led to insights that dominated discussions in fanzines related to metal music bands, among which death metal bands stand out. The results also show individuals' attitudes toward metal music bands (revealed by the word 'like'). Other topics discussed in the fanzines also highlight issues related to metal music bands and are directed toward discussing music albums. The approach provides insights into the content and structure of the documents.

3.4. Implementing Sentiment Analysis with VADER

We used Python scripts to conduct sentiment analysis of metal music fanzines. The texts were prepared for VADER sentiment analysis by dividing them into manageable chunks. The script uses NLTK to tokenize the text into sentences. Then, it groups these sentences into chunks of a specified maximum length (2,500 characters) ending with a complete sentence, ensuring the text is structured coherently. The VADER sentiment analyzer was used to calculate sentiment scores for each chunk. The script reads the pre-processed file, splits it into chunks, and computes the sentiment scores, including positive, negative, neutral, and compound scores.

We applied a Python script (which utilizes libraries Matplotlib and Seaborn) that generates a scatter plot to visualize sentiment scores from metal music fanzines. The scatter plot allows for an intuitive understanding of how different chunks of text are

categorized based on their sentiment scores. This plot visualizes the relationship between chunk IDs and their sentiment scores, with color coding for different categories, helping to identify patterns and trends in the sentiment data (Figure 5).

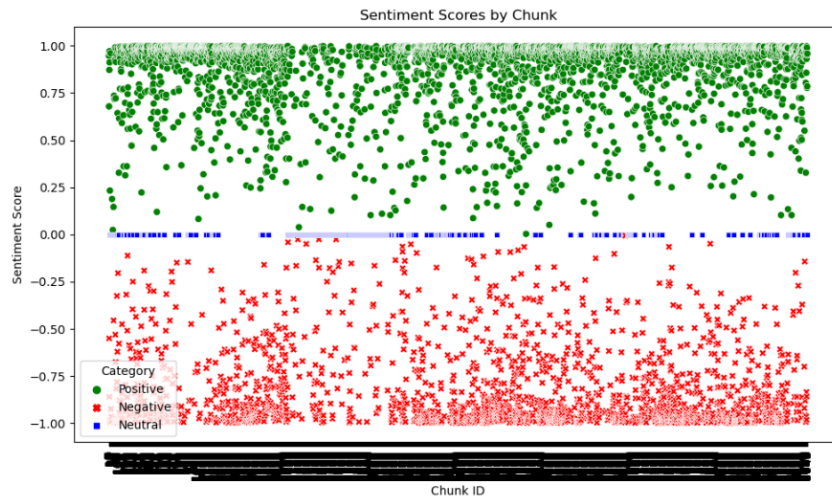


Figure 5. Sentiment Scores by Chunk

In Figure 5, the x-axis represents different chunks of the corpus identified by their IDs, and the y-axis represents the sentiment scores associated with each chunk.

Metal music fanzines display a variety of emotions expressed in their texts. The scatter plot of sentiment scores reveals patterns of emotional moods identified in the fanzines. The green line approaching +1 indicates strongly expressed positive emotions, while the red line approaching -1 indicates strongly expressed negative emotions.

The interactive feature applied to the scatter plot allows us to view the category (positive or negative), chunk ID (number), and sentiment score by hovering the mouse over the sentiment-indicating dots. This functionality enables us to extract a specific chunk automatically and read its content for verification.

When examining the most positive and negative chunks, we found that the negative sentiment range includes elements characteristic of the metal music subculture, such as brutal, black metal, and death metal. These concepts often have a negative connotation in mainstream culture. However, when viewed in a specific context and utilizing knowledge gained during field research, it becomes evident that these seemingly negative terms are often misattributed in sentiment analysis. Participants of the metal subculture assign an extremely positive meaning to these concepts as they relate to the worldview of the metal music subculture.

To verify VADER's sorting of chunks into positive and negative categories and to closely examine the content, we utilized VADER's lexicon and a SentimentIntensityAnalyzer to extract positive and negative words from the newly completed corpora of positive and negative chunks.

The histograms of sentiment scores indicate that both the positive and negative corpora contain respective sentiments. However, in the corpus of positive chunks,

positive sentiments prevail (see Figure 6), while in the corpus of negative chunks, negative sentiments dominate (see Figure 7).

In these histograms, the x-axis represents the sentiment categories (e.g., positive, negative, neutral), while the y-axis shows the frequency or count of sentiments in each category. A higher bar indicates a greater frequency of that sentiment, allowing us to identify the most prevalent and the least. The histograms reveal patterns and trends in the data. For example, positive sentiments are significantly higher than negative ones.

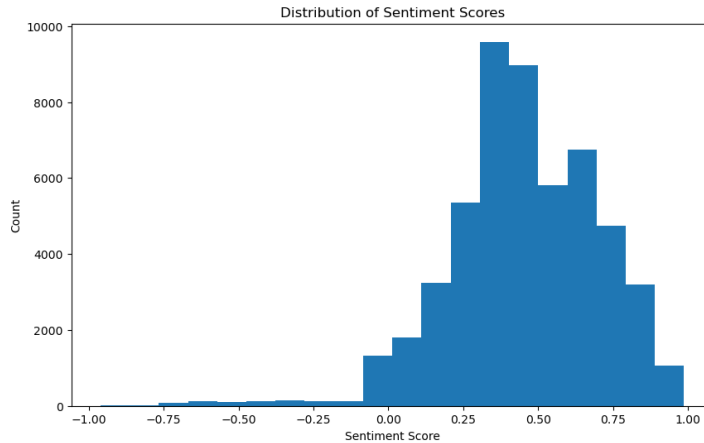


Figure 6. Sentiment Score Distribution in Positive Chunk Sub-corpus

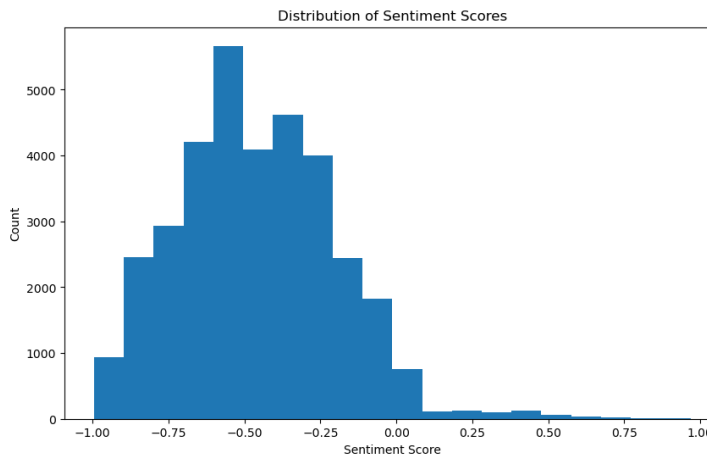


Figure 7. Sentiment Score Distribution in Negative Chunk Sub-corpus

A closer look at positive and negative 'chunks' identified in metal music fanzines texts shows that participants in the metal music subculture perceive the most frequent negative words (e.g., brutal, death, heavy, hard, hell, aggressive, darkness) as positive.

This perception reflects the unique values and aesthetic preferences of the metal community. Participants experience positive emotions when engaging with metal music precisely because it expresses these core values and themes, which resonate deeply within the metal subculture.

3.5. Qualitative Insights: Emotional States in Lithuanian Fanzine "Edge of Time"

Interpreting positive and negative sentiments requires a deeper understanding of the values and worldview of the metal music subculture creators. This section presents examples of metal-specific subcultural expressions from the Lithuanian metal music fanzine "Edge of Time." These expressions (marked as highly negative by the VADER sentiment analyzer) showcase the unique meanings of the fanzine language. They emphasize intensity, darkness, and extreme sonic qualities, demonstrating the subculture's distinct values and linguistic practices.

Table 3 compares this language and its interpretation in normative contexts. The left column contains direct quotes from the fanzine, identified by VADER as strongly negative. The right column provides interpretations of these phrases from the perspective of standard language use. This juxtaposition highlights the phenomenon of a *semantic inversion* within the metal subculture. Words and phrases typically perceived unfavorable in mainstream contexts are used positively by subculture members to describe and praise music, exemplifying the unique linguistic style standard in metal subculture discourse.

Table 3. Examples of Emotion Detection in the Fanzine "Edge of Time"

Fanzine "Edge of Time" Fragment	Normative Language Interpretation
"Crushing brutal, devastating stuff! Best Autopsy's work to date and one of sickest death metal releases in '92"	Words like "brutal," "devastating," and "sickest" are often interpreted negatively, as they imply destruction or illness.
"A flowing, frightening, disturbing artistic work which forces the listener to contemplate the dark side of human existence."	Terms like "frightening," "disturbing," and "dark side" contribute to a negative sentiment by focusing on fear and discomfort.
"Amorphis (Finnish heavy metal band), a crushing crusade of brutal, skull pummeling atmospheric death metal"	Words such as "crushing" and "skull pummeling" suggest violence and aggression, leading to a negative score.
"Deceased aimed for a live sound, and the results are horrifyingly harsh and heavy!"	The words "horrifyingly harsh" indicate something unpleasant or difficult to endure.
"So, in the end, I can only conclude that death remains the king of brutality."	The focus on "death" and "brutality" suggests violence and negativity.
"It is a voice from the depth of hell."	References to "hell" imply suffering or torment.

VADER's analysis, however, reflects mainstream interpretations of language rather than subcultural meanings. For instance, the sentence "But music is not very new or original, so it had not killed me" received a positive score because it lacks overtly hostile language despite its critical tone. As Šandor and Bagic Babac (2023) note, VADER fails to grasp the nuanced layers of humor and sarcasm, rhetorical devices often used in subcultures to convey meaning that contradicts the literal interpretation of words.

Cheung and Feng's analysis of a metal music corpus (1,386 concordances of 11 key lexical words related to expressions of death and darkness) argues that "the patterns of attitude in the metal corpus are responses to oppression in reality, showing resistance against authority" (Cheung and Feng, 2019, p. 21). They describe heavy metal as an "us-versus-them" culture, where "us" signifies members of the heavy metal music community, and "them" refers to individuals and entities perceived as oppressive "others" (Cheung and Feng, 2019, p. 23).

Weinstein's (2000) work on heavy metal culture provides a more specific framework for understanding metal music fanzines. She argues that heavy metal's use of evil imagery and dark symbolism is a form of cultural rebellion, serving multiple purposes: It is a way for group members to cope with societal rejection, provides a means of challenging mainstream norms, and reflects a complex relationship with society, balancing subcultural pride with internalized negative judgments. Ultimately, Weinstein posits that heavy metal serves as a "cultural coping mechanism" for those who feel marginalized (Weinstein, 2000, p. 262).

Our study shows that fanzine publishers introduce innovations in the metal music world by consistently using linguistic patterns specific to the subculture and strengthening the shared subcultural identity within the metal community. This distinctive communication style validates and reinforces the values and aesthetics prized by metal fans, creating a sense of belonging and authenticity within the subculture.

4. Results

Our study explored computer analysis in researching cultural identity within fanzines, revealing several key findings:

Perplexity Analysis. The experimental use of Perplexity AI unveiled techniques for obtaining relevant empirical information. Analysis of individual fanzines provides detailed content information, while examination of multiple issues (sub-corpus analysis) offers broader thematic and structural insights across the collection.

Topic Analysis. Word frequency and Latent Dirichlet Allocation (LDA) topic modeling identified dominant themes in metal music fanzines, primarily focusing on bands, music, and albums, emphasizing death metal.

Sentiment Analysis. VADER (Valence Aware Dictionary and Sentiment Reasoner) analysis revealed a wide range of emotions in fanzine texts, from highly positive (+1) to strongly negative (-1) sentiments. This illustrates the deep emotional connections and critical perspectives within the metal community.

Mixed Methods Approach. Our study confirmed the significance of combining quantitative and qualitative methods. While computational analysis provided broad patterns, qualitative analysis revealed potential links to *semantic inversion* in expressing subcultural identity, such as the positive use of traditionally negative terms.

Cultural Rebellion. Our findings support the concept of *cultural rebellion* in the metal music subculture, demonstrating how linguistic expressions reflect resistance against social norms and impact identity formation. These findings extend earlier works on subcultural resistance (e.g., Becker, 1963; Clinard, 1974) and cultural rebellion in the heavy metal subculture (Weinstein, 2000) by adding new insights into how subcultural rebellion manifests through the linguistic symbolism of fanzines.

5. Conclusions and Future Implications

The paper aims to make following contributions and to set future research directions:

Methodological Contributions. The study highlights the effectiveness of combining quantitative and qualitative approaches in sentiment analysis of metal music fanzines. It demonstrates the potential of computational analysis in subcultural studies.

Theoretical Insights. Our research provides a foundation for further exploration of the interplay between language, sentiment, and cultural identity in modern computing and related disciplines. The findings extend our understanding of how subcultural rebellion manifests linguistically in metal communities.

Future Research Directions. Exploring alternative subcultural expressions in the Lithuanian language and developing specialized dictionaries for various subcultural groups is significant. A unified coding system (Slingerland et al., 2020) should be created to enhance social group comparative studies and allow for more nuanced cross-cultural analyses.

Practical Implications. The study lays the groundwork for developing the `jauka.knf.vu.lt` database, a resource for researchers and students to contribute to coding activities and systematically study data.

In conclusion, this study opens up new avenues for interdisciplinary research at the intersection of linguistics, cultural studies, and computational analysis. It paves the way for innovative approaches to understanding subcultural expressions and identities, contributing to theoretical knowledge and practical applications in the field.

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References

- Almer, J. (2020). The wild underground extreme of human rights and ecological activities: Czechoslovak, Czech and Slovenian hardcore punk fanzine cultures from the 1980s to the present. *Forum Historiae*, *14*(1), 68–83. <https://doi.org/10.31577/forhist.2020.14.1.6>
- Becker, H. S. (1973). *Outsiders: Studies in the sociology of deviance*. New York, NY: Free Press.
- Cheshire, J. (1982). Linguistic variation and social function. In S. Romaine (Ed.), *Sociolinguistic variation in speech communities* (pp. 153–166). Edward Arnold Ltd
- Cheung, J. O., Feng, D. (2019). Attitudinal meaning and social struggle in heavy metal song lyrics: A corpus-based analysis. *Social Semiotics*, *31*(2), 230–247. <https://doi.org/10.1080/10350330.2019.1601337>
- Clarke, J. (2006). Style. In S. Hall & T. Jefferson (Eds.), *Resistance through rituals: Youth subcultures in post-war Britain* (pp. 175–191). Unwin Hyman.
- Clinard, M. B. (1974). *Sociology of deviant behavior* (4th ed.). Holt, Rinehart, and Winston.
- Cohen, A. K. (1955). *Delinquent boys: The culture of the gang*. Free Press.
- Cohen, A. P. (1993). Culture as identity: An anthropologist's view. *New Literary History*, *24*(1), 195–209.
- Daugavietis, J. (2020). Music Samizdat as Zines? The Case of "Ot Vinta" from Soviet Latvia. *Forum Historiae*, *14*(2), 73–92.
- Eckert, P. (2000). Language variation as social practice: The linguistic construction of identity in Belten High. In P. Trudgill (Ed.), *Linguistic variation as social practice*. Wiley-Blackwell.
- Forum Historiae. (2020). *Forum Historiae*, *14*(1-2). <https://www.forumhistoriae.sk/en>
- Gold, M. K. (Ed.). (2012). *Debates in the digital humanities*. University of Minnesota Press.
- Gross, A., Murthy, D. (2014). Modeling virtual organizations with Latent Dirichlet Allocation: A case for natural language processing. *Neural Networks*, *58*, 38–49. <https://doi.org/10.1016/j.neunet.2014.05.008>
- Hall, S., Jefferson, T. (Eds.). (2006). *Resistance through rituals: Youth subcultures in post-war Britain* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203357057>
- Hebdige, D. (1997). *Subculture: The meaning of style*. Routledge.
- Hutto, C., Gilbert, E. (2014). VADER: A parsimonious rule-based model for sentiment analysis of social media text. *Proceedings of the International AAAI Conference on Web and Social Media*, *8*(1), 216–225.
- Jacobs, A. (2002). Appropriating a slur: Semantic looping in the African-American usage of nigga. *M/C Journal*, *5*(4). <https://doi.org/10.5204/mcj.1972>
- Kairaitytė-Užupė, A. (2024a). Neformalių XX a. pabaigos - XXI a. pradžios Lietuvos jaunimo leidinių - fanzinių - leidybos tendencijos [Publishing trends of informal Lithuanian youth publications - fanzines - at the end of the 20th century and the beginning of the 21st century]. *Knygotyra*, *82*, 143–169. <https://doi.org/10.15388/Knygotyra.2024.82>
- Kairaitytė-Užupė, A. (2024b). The Lithuanian Fanzine Collection: Creating and Visualizing Metadata. *Baltic J. Modern Computing* *12*(4), 477–486

- Kopecká, M. (2020). *Proměny feministického zinu Bloody Mary s příchodem internetu* [The transformation of the feminist zine Bloody Mary with the advent of the internet]. *Forum Historiae*, **14**(2), 126-141.
- Labov, W. (2006). *The social stratification of English in New York City* (2nd ed.). Cambridge University Press. <https://doi.org/10.1017/CBO9780511618208>
- Lang, S., Ommer, B. (2021). Transforming information into knowledge: How computational methods reshape art history. *Digital Humanities Quarterly*, **15**(3). <http://www.digitalhumanities.org/dhq/vol/15/3/000560/000560.html>
- Liubinienė, N. (2009). Metalo muzikos gerbėjų "fanzinai": subkultūrinės grupės tapatybės kodai. [Fanzines for metal music fans: subculture group identity codes]. *Grupės ir aplinkos*, **1**, 199–220.
- Lomíček, J. (2020). On football fanzines: A communication platform for Czech and other European football fans. *Forum Historiae*, **14**(1), 120–139.
- Mackenthun, G., Dosch, J. (Eds.). (2023). *Subversive semantics in political and cultural discourse*. Columbia University Press. <https://doi.org/10.14361/9783839461778>
- Manovich, L. (2016). The science of culture? Social computing, digital humanities and cultural analytics. *Journal of Cultural Analytics*, **1**(1). <https://doi.org/10.22148/16.004>
- Martin, J. R., White, P. R. R. (2005). *The language of evaluation: Appraisal in English*. Palgrave Macmillan.
- Moretti, F. (2000). Conjectures on world literature. *New Left Review*, **1**, 54–68.
- Perplexity (2023). Perplexity.ai (AI Chatbot) [Large language model-manual]. <https://www.perplexity.ai/>
- Roszak, T. (1969). *The making of a counter-culture: Reflections on the technocratic society and its youthful opposition*. Doubleday & Company, Inc.
- Šandor, D., Bačić Babac, M. (2024). Sarcasm detection in online comments using machine learning. *Information Discovery and Delivery*, **52**(2), 213–226. <https://doi.org/10.1108/IDD-01-2023-0002>
- Šima, K., Michela, M. (2020). Why fanzines? Perspectives, topics, and limits in research on Central Eastern Europe. *Forum Historiae*, **14**(1), 1–16. <https://doi.org/10.31577/forhist.2020.14.1.1>
- Slingerland, E., Atkinson, Q. D., Ember, C. R., Sheehan, O., Muthukrishna, M., Bulbulia, J., Gray, R. D. (2020). Coding culture: Challenges and recommendations for comparative cultural databases. *Evolutionary Human Sciences*, **2**, Article e30. <https://doi.org/10.1017/ehs.2020.30>
- Weinstein, D. (2000). *Heavy metal: The music and its culture*. Da Capo Press.
- Williams, P. J. (2011). *Subcultural theory: Traditions and concepts*. Polity Press.
- Willis, P. (1978). *Profane culture*. Routledge.

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