

Tuning Minds: How Music Drives Nationalistic Propaganda Across Countries

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Author Note: The views expressed herein are those of the authors and do not reflect the position of the United States Military Academy, the Department of the Army, or the Department of Defense.”

Abstract: This study investigates how different states and political regimes seek to leverage music to persuade their populations and promote an agenda. This research aims to uncover new perspectives on factors contributing to the stability of nuclear-capable nations. This study first employs a qualitative, sociological approach to understanding music using case study datasets for historical and current nations of interest. We then move to a quantitative approach utilizing two perspectives: 1) a lyrical analysis with a large-language model, and 2) a musical analysis via MATLAB sound-analysis software. Both perspectives are combined through a measure of Euclidean Distance, offering a distinct perspective on music and influence. We provide valuable insights to the DoD that extend the current understanding of how states may use music in the operational environment. The study's findings contribute to our understanding of persuasion in nuclear-capable countries, highlighting areas for future research and potential policy or practical applications.

Keywords: Music; Influence; Persuasion; MATLAB; Euclidean Distance; DYMATICA; RAVEN; MIR Audio Toolbox

1. Background

Music—rhythmic sounds conveying emotion—has long been a tool of propaganda. With modern technology enabling easy access to streaming, it's become a powerful influence. Meanwhile, censorship of musical elements can shape narratives, define social groups, and strengthen our adversarial capabilities. Consistently promoting anti-Western or extremist ideals in adversarial states through musical narratives and censorship capabilities produces a threat to the U.S. Department of Defense—intelligence efforts must be strengthened to counter the mass influence of musical propaganda that has not been researched. Sandia National Laboratories uses an AI model to analyze the operational environments of adversarial nations and assess their influence over populations. The model integrates behavioral science, engineering, and computer science to examine music, leader speeches, and public reactions. As music remains a powerful tool of mass control, it continues to reinforce authoritarian ideals (Howerton, 2023).

1.1. Sociological Theories

Below are the sociological theories most applicable to the realm of music and its influence on a population. Such a theoretical application is beneficial because the behavioral aspect of society can be evaluated. Sociological theory gives insight into the micro and macro level interactions of society.

1.1.1. Central Persuasion

Central persuasion can be defined as a method of persuasion that aims to persuade audiences with high motivation and a high level of competency towards a message (Heinzen & Goodfriend, 2020). Persuasion is achieved through the thoughtful examination of issue-relevant considerations, targeting people who exhibit high elaboration. (Farivar, Wang, & Yuan, 2023). Central persuasion is focused on attracting people who are focused on the content of the musical propaganda delivered. In the context of music, leaders or governments could utilize this type of persuasion in attentive and educated audiences, attempting to solicit buy-in from their citizens by creating lyrics that cause the audience to carefully consider the message displayed.

1.1.2. Peripheral Persuasion

Peripheral persuasion can be defined as a method of persuasion that targets audiences with low motivation and low competence (Heinzen & Goodfriend, 2020). In this persuasion technique, attitudes are not formed on the content of the music, but rather on environmental cues such as credibility, power, attractiveness, or even the characteristics of the information source (Larsen & Phillips, 2002). This component of persuasion can also focus on emotional appeals to attract audiences, such as the atmosphere, the person delivering the message, or the attractiveness of the propaganda (Daniel J. O’Keefe, 2015). In the context of music, this form of persuasion can be used by famous artists or those who are more attractive to the public. The use of peripheral persuasion through music allows for a quicker socialization of narratives among a population due to its widespread outreach.

1.1.3. Social Learning Theory

Social Learning Theory is a sociological theory in which individuals obtain skills, knowledge, and beliefs by observing the behaviors and correlating consequences of others (Henry Tajfel, 1974). By observing others, people can learn norms and acceptable behavior to apply in their lives. Adolescent behavior is typically learned from parents, friends, or other influential people in their lives who generally engage in behavior that they want their kids to pursue. This is beneficial to our research because adversarial governments can use prominent figures as role models for acceptable behavior and norm processes. Adversarial governments can utilize figures such as musicians to produce government supported songs to socialize citizens toward accepted behaviors, which can socialize malleable audiences.

1.1.4. In-Group-Bias

In-group bias is the tendency for groups to favor and provide better treatment to members of their own groups. These social groups are based on cultural beliefs, ideas, and values. Social identity theory states that individuals derive a portion of their self-concept from their membership in social groups (McLeod S, 2008). Social identity theory can help further explain in-group bias, where individuals categorize themselves, leading to the creation of their corresponding identities (Henry Tajfel, 1974). However, in-groups do not always exhibit healthy behavior toward those outside of the categorized group. Out-group bias can lead to racism, prejudice, discrimination, and overall conflict as certain opportunities extend only to a limited number of groups (Pilat D & Sekoul D, 2021). This impacts our research because governments can create strong in-groups through music, using it as a tool of cohesion and mass identity.

1.1.5. Rational Choice Theory

The rational choice theory can be evaluated as one method of explaining how populations choose a course of action. Rational choice theory states that actors make decisions that align best with their own interests, which can be applicable when looking at the decision making of populations of interest. Most commonly, individuals will socialize to a behavior that best benefits their own well-being or that of a group. At times, this decision could result in conformity, as it keeps citizens safe. Regimes of Russia, China, and Nazi Germany historically suppressed freedom of expression, risking death or exile for dissent. It is important to evaluate citizens’ behavior through sanctions, limitations, and sociological theory to see if their buy-in for the cause is legitimate or ensures survival.

1.2. State-Supported Musicians

Due to music’s power to persuade, governments and heads of state have taken advantage of music to influence their populations. Popular artists or themes of music can often be directly funded by the government, producing influential narratives from advertised music onto the national population.

1.2.1. Nazi Germany

Nazi Germany utilized music as a powerful tool for mass control, fostering complete obedience to an individual or group (Howerton, 2023). The Nazi regime ‘weaponized music’, using it in unprecedented ways to influence public perception (Howerton, 2023). The Nazi Party used renowned composers to create nationalistic anthems to further persuade the German populace. Composers such as Bach, Beethoven, and Schubert to help shape his national identity (Riding, 2004). In addition, the regime targeted the younger generation by promoting music that instilled national pride and reinforced a sense of racial superiority (Cathcart, 2006). These musical strategies play a crucial role in shaping Nazi Germany’s nationalistic and extremist identity, particularly among specific demographic groups.

1.2.2. United States

The United States has long had one of the strongest and fastest-growing music industries, often influencing global audiences (Saito, 2020). Music has historically served as a tool of warfare; during the Cold War, for instance, it shaped global

Heatmap of Lyrical Similarities

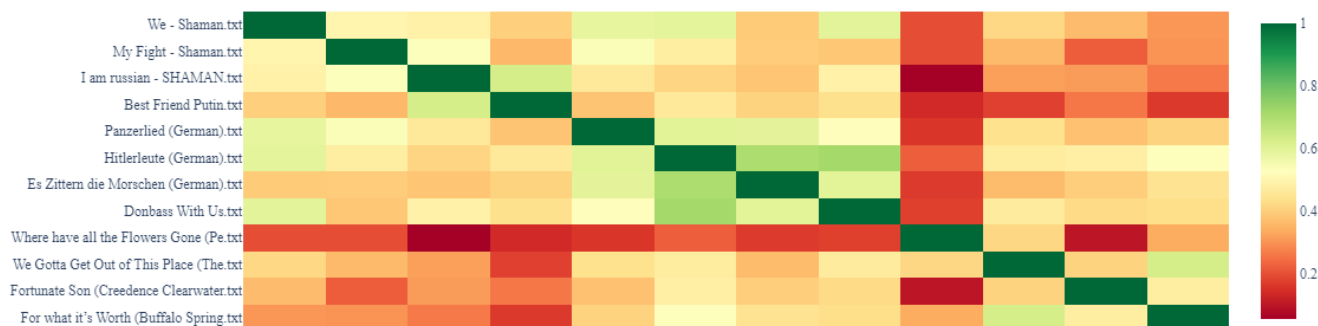


Figure 1: Songs from our datasets processed using thematic similarities into a large language model. Songs with few similarities are shown in red while songs with more similarities are shown in green. Identical songs are in dark green.

perceptions more than conflict did (Bittner, 2012). Jazz was used to project the “positive, upbeat aspects of American culture,” spreading through Soviet Russia and inspiring hopes for democratic ideals, clashing with Soviet values (Bittner, 2012). However, not all music supported U.S. policy—during the Vietnam War, artists like Joan Baez and Peter Seeger protested American intervention, enabled by the lack of censorship.

1.2.3. Russia

In contrast to the United States, countries such as Russia and China employ censorship tactics, banning streaming platforms such as Spotify and Apple Music that are commonly used in Western Cultures. Since the Russian government exercises control over music, songs that avoid or further the Kremlin’s agenda or Putin’s narratives are released (Detector Media, 2023). Russia goes to great lengths to spend millions of dollars on pro-war concerts where they force their citizens to attend (Stanislav Pohorilov, 2022). Music is used as a strategic tactic in Russia, used to socialize their national population at large to join the in-group (Kremlin government). (Biasioli, 2023). A common function of music is to create cohesion, solidarity, and targeted emotion, which countries such as Russia strive to instill into their adolescent populations. As Russia’s younger populations have become more educated, Russia focuses on the “centrality of their lyrics” to garner support through the central route of persuasion (Pierobon, 2013). He asserts that Russia will strive to use music with a lyrical approach that resonates with younger populations to “unite their citizens to a common cause”.

2. Method

Our team conducted a descriptive qualitative analysis to examine similarities and differences in music between cultures and its influence on youth, using a two-step approach to gain a comprehensive understanding of its effects. The first step is a lyrical analysis that utilizes a large-language model to understand the differences between the themes of musical propaganda. Subsequently, a quantitative analysis framework will be suggested using a musical analysis, which uses MATLAB to perform a comparison using Euclidean distance and visualize using a heatmap (Lartillot, 2008).

2.1. Lyrical Analysis

2.1.1. Technology

The Risk Analysis Virtual Environment (RAVEN) is an Artificial Intelligence Engine that allows us to implement a large language model capable of parsing large amounts of text (Rabiti et al., 2013). By declaring several themes, the NLP model constructs vectors representing the prominence of declared themes in each of the songs.

2.1.2. Procedure

In Figure 1, we use RAVEN artificial intelligence (provided to us through Sandia National Laboratories) with our inputs being Nazi Germany lyrics and contemporary Russian songs. RAVEN AI compared each song to itself to produce a cosine similarity measure of which themes were displayed among each of the songs. To validate the proficiency of the model, we compared the vectors of the songs in their original language to their English translation.

2.2. Musical Analysis

2.2.1. Technology

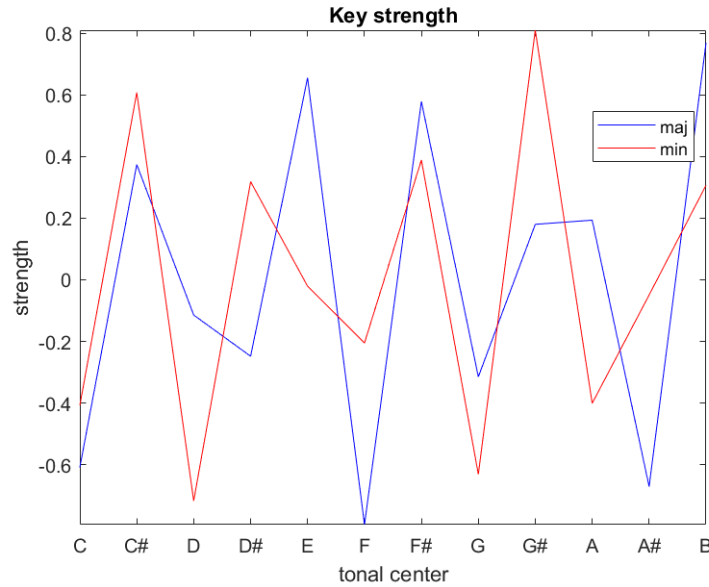


Figure 2: Identified Tonal Centers for the Russian song "I am Russian" by SHAMAN.

The MIRToolbox is a package in MATLAB that allows us to input musical sound files to conduct an analysis of the music. The MIRToolbox is able to provide information on several features, including Brightness, Roughness, Dissonance, Timbre, Fluctuation, Key Strength, Attack, Pitch, Tempo, Tonality, and Pulse Clarity. With any of these elements, MIRToolbox will also produce helpful visualizations of our music. For example, we can analyze the tonal center and determine the most likely key of the song, as seen in Figure 2. Understanding these qualities of the music prove useful in sentiment analysis and allow for further associations between the qualities of music and their influence.

2.2.2. Procedure

The team began the musical analysis by entering sound files from the same dataset that was used to conduct our lyrical analysis. The emphasis in data collection was placed on the tempo, rhythm, and tonality of the music. With these elements of the data, our team produced normalized, quantitative scores that could be used to compare each song to each other.

$$d(\mathbf{p}, \mathbf{q}) = \sqrt{\sum_{i=1}^n (q_i - p_i)^2} \quad (1)$$

Euclidean distance, as demonstrated in Equation 1, **measures the distance between song p and song q across n parameters**. The smaller the Euclidean distance, the more similar the two songs are in quantitative measures. The features of the music that we chose to analyze can therefore be combined in a single statistic to measure the difference between two pieces of music across three different dimensions. Furthermore, to gather a picture of quantitative differences between the music of two different cultures, we can take the distance between all songs, and cluster comparisons across whole cultures. To represent this visually, we can produce a heatmap that takes each Euclidean distance and compares them with each other. Figure 3 is a representation of this capability.

2.3. Synthesis

All the findings from our lyrical and our musical analysis feed into a larger model from our client which is referred to as *DYMATICA*. This model is a qualitative and quantitative summation of the differences across cultures that are influenced by states trying to utilize persuasion over their people in the form of various actors and factors. By utilizing our analysis, we can

Heatmap of Musical Similarities

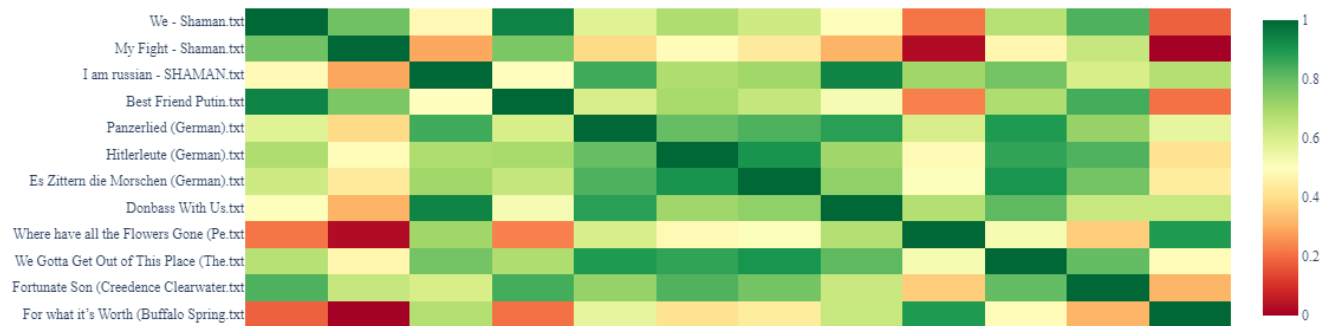


Figure 3: A heatmap comparing the musical features of each song with each other in a sample dataset of songs. The Euclidean distance between two songs was put through an inverse normalization in order to overlay data with the aforementioned lyrical analysis. The larger the distance, the more similar the songs are to each other. Songs with more similarities are shown in green while songs with less similarities are shown in red. Identical songs are shown in dark green.

better rationalize the decisions that states make to influence their people. In Figure 4, we combined our analysis from Figures 1 and 3 to produce a holistic analysis of a culture based on the messaging that is inherent in their music. These results will feed into *DYMATICA*, allowing our client to produce greater cultural understanding and analysis.

Heatmap of Musical and Lyrical Similarities

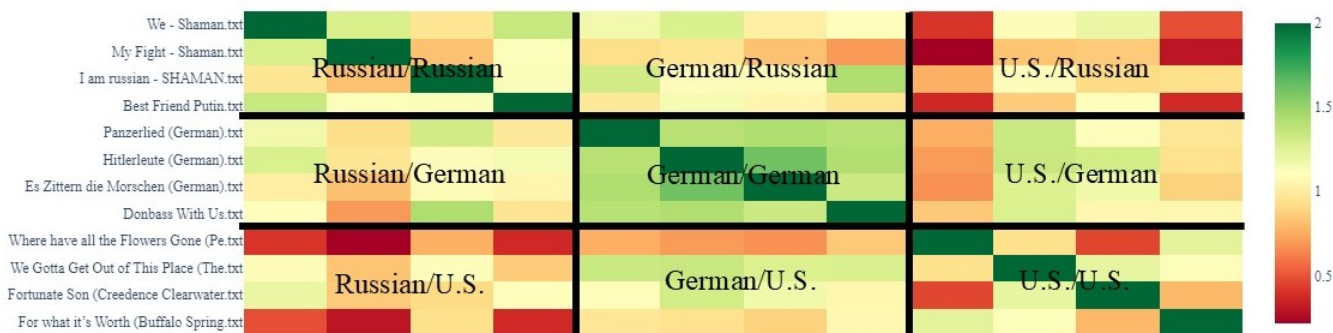


Figure 4: A heatmap overlaying the results of the lyrical analysis and the musical analysis. The songs with greater lyrical and musical similarity are green, and the songs with less similarities are in red. The dark-green diagonal is the comparison of each song with itself. The top-right quadrant compares Russian songs with Russian songs, the bottom-left quadrant compares German songs with German songs, and the top-left and bottom-right quadrants compare Russian songs with German songs.

3. Discussion

3.1. Data Collection

Our research team located data for the initial trials by finding music that matched the time period and location of the culture in question. Artists suspected of propaganda, such as nationalistic messaging by Shaman, was selected for the purposes of analyzing propaganda on the molecular level. Anti-war messaging, such as songs by Creedence Clearwater Revival, were utilized for the purpose of understanding if the music of Nazi Germany employed opposite themes and musical elements. Our analysis featured here found four songs from modern-day Russia, with Nazi Germany and Vietnam-era US as the control groups.

3.2. Findings

From the heatmap analysis that we conducted, we found a 70% difference between US and Russian songs, a 20% difference between Russian and German songs, and a 40% difference between US and German songs. There were 18 strong lyrical matches with a z-score above 0.60 found between a total of 34 researched German and Russian popular songs. Hitler and Putin's speeches share similar themes of patriotism, victory, and defeating oppression. Modern Russian artists who speak out are censored or removed, leading others to stay silent to protect their popularity. With only state-approved music, young audiences are more vulnerable to persuasion and less likely to think critically.

3.3. Future Work

First, while the MIRToolbox offers significant data across several musical categories, the team must evaluate which ones contribute the most to the fields of propaganda. Second, it is unclear if certain components of the Euclidean Distance should be weighted to prioritize certain features over others (e.g. tempo over tonality). Third, if the same AI processes used on lyrical analysis can be used in the musical analysis, moving outside of MATLAB, a more cohesive synthesis will be achieved. Additionally, our team has the goal of analyzing China in the model. China has long utilized propaganda to their advantage, specifically in the use of spreading false information among their citizens (Nomaan Merchant & Matthew Lee, 2023). Analysis of the Chinese Operational Environment will prove the most beneficial to the United States and the fight against our adversaries.

4. Conclusion

Our research has the intended purpose of providing analysis of music as it relates to psychological operations. Through a system-of-systems approach, we can provide a tool to analyze the Operational Environment from a new perspective. For the Department of Defense and the United States military, this is a valuable opportunity to understand why our adversaries employ tools of influence, such as music, over their populations. Aided with this understanding, we have the opportunity to employ counterintelligence and counter psychological operations to the nations in question. Ultimately, continuation of this work will provide a "plug-and-play" model for musical and lyrical analysis across a broad expanse of datasets and applications.

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