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Airwave Echoes: The Role of Language and Radio Propaganda in Fostering Hate Speech. A Sentiment Analysis of the RTLTM during the Rwandan genocide

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Airwave Echoes:
The Role of Language and Radio Propaganda in Fostering Hate Speech.

A Sentiment Analysis of the RTLM during the Rwandan genocide



**Universiteit
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The Netherlands

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1. Introduction

The use of media as a tool to disseminate propaganda to fuel hatred has been a prevalent and influential phenomenon throughout history (Chomsky, 2011). Mass media outlets such as television, radio, magazines, inter alia, have been utilized to negatively manipulate public opinion towards specific ethnic or minority groups (Welch, 1993). The power of language and discourse in shaping intergroup relations and contributing to ethnic polarization and conflict has been widely acknowledged in academic literature (Somer, 2001).

This research aims to investigate and analyze the changes in language and propaganda disseminated through the Radio Télévision Libre des Mille Collines (RTLM) broadcasts towards the Tutsi minority group during the Rwandan genocide. Rwanda, a country historically marred by ethnic tensions and divisions, serves as an exceptional case study to delve into the intricate dynamics between media, language and intergroup conflict. The Rwandan genocide, a tragic chapter in human history, witnessed the systematic and brutal extermination of Tutsis by the Hutu population. Between April and July of 1994, an estimated 800,000 Tutsis were massacred (Li, 2004). The RTLM emerged as a powerful tool in amplifying and mobilizing anti-Tutsi sentiments, contributing to the catastrophic violence that unfolded during the genocide. Despite the evident impact of RTLM and similar media outlets in exacerbating inter-ethnic tensions and fueling violence, there exists a notable dearth of quantitative studies. Such studies should comprehensively analyze the evolution of language and propaganda used against the Tutsi minority group during this harrowing period.

Given the complex interplay of societal, cultural and historical factors in shaping the intergroup dynamics, Rwanda provides a compelling backdrop for this research inquiry. The existing literature presents a myriad of theoretical perspectives on the relationship between media,

intergroup relations and conflict. Moreover, the ongoing debate within the realm of political science concerns how views of ethnic minority groups were shaped by propaganda, and how such usage of hate speech and derogatory language can increase hatred towards ethnic groups. This is still an ongoing source of debate and lacks consensus in the field, highlighting a research gap. As previously mentioned, the quantitative examination of how language and propaganda evolved during the Rwandan genocide to incite hate speech against the Tutsi minority remains largely unexplored. By filling these crucial gaps in literature, this research aims to offer nuanced insights into the following research question: *How did the use of language towards the Tutsi minority group in the RTLM broadcasts change throughout the Rwandan genocide?* By exploring the given question, the research aims to understand the role of language and media in perpetuating ethnic polarization, offering implications for understanding and mitigating similar patterns of hate speech and derogatory language in other sociopolitical contexts. Upon exploring the given research question, the findings suggest that the incidence of hate speech and derogatory language increased as the genocide unfolded. Additionally, the frequency of such negative language also augmented as the genocide progressed.

This thesis will analyze the proposed question by delving into existing literature and theory on the topic in general, discussing similar cases. The following section highlights the choice of Rwanda as a case study, and consequently delves into key conceptualizations and operationalizations. Next, the methodology is outlined. Sentiment analysis results are provided thereafter, followed by their respective analyses and discussion. Moreover, the research question is answered in depth. The paper finally concludes by outlining the limitations and implications of the research.

2. Literature Review

The following section will elaborate on existing literature on the relationships between media, intergroup relations, ethnic polarization (EP) and conflict. Incidences of ethnic conflicts have been increasing, as well as its effects. Several authors have argued that “ethnically diverse societies” have a “higher probability of ethnic conflicts which can lead to civil war” (Montalvo and Reynal-Querol, 2005, p. 796). Similarly, Klašnja and Novta (2016) find that “ethnic diversity is often associated with higher intensity of conflict”, although this argument is contested and needs further evidence (p. 931). Thus, in order to address these contradictory findings, scholars have redirected their attention towards more nuanced theories, considering factors such as the political significance of ethnic communities, or the contrast between “group-based dynamics” and “individualistic aspects of conflict” (p. 931). Broadly, the authors argue that national and regional ethnic distributions are types of “intergroup inequalities” (p. 930). Consequently, the research field delves into intergroup dynamics and investigates how conflict can be shaped by social and cultural disparities, similar to Rwanda. Research shows that there tends to be more conflict where “a large ethnic minority faces an ethnic majority” (Montalvo and Reynal-Querol, 2005, p. 797). In the case of Rwanda, for example, the Tutsi ethnic group constituted 14% of the population, whereas Hutus constituted the vast majority, encompassing 85% of the population (United Nations, n.d.).

2.1 Ethnic Conflict and the Role of Media

Historically, media and propaganda have been used to disseminate negative views towards ethnic out-groups, as Blouin and Mukand (2019) examine. Their research demonstrates whether radio-broadcast propaganda influenced inter-ethnic attitudes in Rwanda. During the genocide, radio transmissions were used to incite violence. Nonetheless, there is a lack of research and

consensus on how language and propaganda were employed by the RTLM to disseminate negative views towards Tutsis, and how this evolved during the genocide.

Yanagizawa-Drott (2014) examines how mass media influences conflict and state-sponsored violence against civilians, focusing on the impact of radio broadcasts that incited hate against Tutsis. The RTLM was led by propaganda efforts by “broadcasting inflammatory messages calling for the extermination of the Tutsi minority” (p. 1948). The author argues that there is only qualitative evidence to show such effects, however large-scale quantitative evidence is lacking in this domain. Therefore, quantitative content analysis (QCA) on the language used by radio broadcasts is a significant gap in research.

Furthermore, Yanagizawa-Drott (2014) hypothesizes that mass media could have contributed to the escalation of violence through two overarching mechanisms (p. 1948). Firstly, consistent with the body of literature on “persuasive communication”, broadcasts might have exerted direct persuasion effects by “enticing listeners to engage in violence against Tutsis”, as they insisted that it was more favorable than refraining from participation (p. 1948). Secondly, drawing from extensive scholarship in the social sciences and regarding the role of social interactions (specifically in mediating the impacts of mass media), such persuasion efforts could have facilitated the spatial dissemination of violence. This extension could reach beyond the immediate locales of radio reception (pp. 1948-1949). The findings also indicate that the broadcasts were associated with heightened levels of violence (p. 1950). Moreover, the broadcasts demonstrated positive spill-over effects on militia led violence, mobilizing the Hutus throughout the Rwandan genocide (p. 1950). Nonetheless, this fails to show whether the broadcasts increased in negative language as the genocide escalated, and how this contributed to further EP among the two ethnic groups, as well as how language was used in the broadcasts.

Additional literature from other countries reveal similar results, such as the case of Croatia, where exposure to Serbian radio “catalyzed anti-Serbian sentiments” (Blouin and Mukand, 2019, p. 1012). Likewise, radio effects on Nazi party popularity and anti-Semitic actions in Nazi Germany also had a comparable effect. Joseph Goebbels, Hitler's propaganda minister called radio “the most important instrument of mass influence that exists anywhere” (Welch, 1993; Yanagizawa-Drott, 2014, p. 1948). Welch (1993) also argues that the effective use of propaganda by Hitler during the Nazi regime propagated hatred, promoted anti-semitism and orchestrated ethnic cleansing (Yanagizawa-Drott, 2014, pp. 1947-1948). Hitler, alongside Goebbels, employed diverse media channels such as posters and films to vilify and dehumanize Jewish individuals. Through the dissemination of false and derogatory stereotypes, Jewish people were portrayed as a peril to the German population, which consequently led to their oppression (pp. 1947-1949). It is evident that propaganda played a pivotal role in cultivating an atmosphere of apprehension and animosity towards Jewish communities, facilitating their dehumanization and social exclusion. The regime's strategic use of propaganda to advance their interests of racial purity ultimately precipitated the implementation of genocidal policies targeting majoritarilly Jews, alongside other marginalized groups, albeit in the minority (p. 1948). This underscores how propaganda functioned as a mechanism for fomenting and rationalizing ethnic cleansing, culminating in the Holocaust. Thus, the examination of propaganda's role in fomenting hatred and legitimizing ethnic cleansing constitutes a significant facet of Third Reich Studies, showcasing the manipulation of public sentiment and the vast influence wielded by mass media in shaping societal perceptions and behaviors among different ethnic groups (pp. 1947-1949). Similarly, the relentless propaganda campaign used by Bosnian Serb forces during the genocide of Srebrenica offers comparable insights. Such propaganda was utilized to demonize Bosnian Muslims, portraying them as

existential threats to Serbs (Karčić, 2016, pp. 409-418). This propaganda justified military actions to support ethnic cleansing campaigns, resulting in the massacre (pp. 409-418).

As Lee (1945) argues, governing elites in autocratic regimes have frequently utilized mass media – often directly controlled by them – to incite citizen support and involvement in violence targeting specific groups. As seen in the cases of Nazi Germany, Rwanda, and Croatia, among others, propaganda served as an effective tool to ethnically marginalize minority groups. Often, these elites employ differing techniques, all aimed at manipulating public sentiments and to incite hostility towards the targeted group.

Taking the literature into consideration, it is evident that radio broadcasts and other forms of government propaganda can change perceptions of minority groups by disseminating negative messages. Additionally, it is unclear how these governing elites refer to minority ethnic groups, and what sort of persuasive language and propaganda they spread in order to have perpetrated mass murder against them. More specifically, another question that arises is what sort of language is used in the broadcasts and what arguments were made to convince the population to perpetrate such atrocities. The categorization of minority ethnic groups in the broadcasts and their designation of them as enemies is a question that needs to be investigated to assess how media influences behavior. Also, due to the ethnically polarized context of the conflicts, it is necessary to research how EP worsens. Thus, this study seeks to address a significant gap in research by examining the use of language and rhetoric against the Tutsis by the RTLM throughout the Rwandan genocide.

3. Theoretical Framework

Drawing on the literature, the following theories can be identified and discussed in order to answer the research question, which provides the most relevance to the research query.

3.1 Social Identity Theory

Social identity theory (SIT) posits that "group membership serves as an interpretive lens that frames beliefs, attitudes, and evaluations of the self and others" (Tajfel and Turner, 1979; Roozen and Shulman, 2014, p. 166). According to SIT, during intergroup conflicts, individuals seek to maximize the "meta-contrast principle" to differentiate the "in-group" from the "out-group" (Tajfel, 1959; Roozen and Shulman, 2014, p. 166). This study can also emphasize the process of depersonalization and shift in language over time, from referring to minority groups as out-groups, to broadening the categorization and encompassing all minorities as the conflict intensifies. Roozen and Shulman (2014) therefore highlight the potential escalation in the frequency of dehumanizing language, exemplified by the increased use of terms such as "cockroaches" or "vermin", indicating the intensification of derogatory language during the Rwandan genocide.

3.2 Ethnic Polarization as Cascade

The case of the former Yugoslavia provides useful theories about how EP can become self propagating if "the protagonists of a certain image of ethnic identity, called the divisive image, appear to have reached a critical mass" (Somer, 2001, p. 127). The author argues that polarization intensifies and perpetuates itself when a large number of individuals strongly endorse a particular perception of ethnic identities, coined as the "divisive image" (p. 127). Once the critical mass is reached, these individuals are not only able to exert a significant influence within society, but their advocacy of the divisive image becomes influential and widespread. As a result, the divisive image gains momentum and dominance, contributing to the polarization of society along ethnic lines. Exercising the previous notions, Somer (2001) explains the rapid and massive EP, applying them to Yugoslavia. Its main premise posits that the "nature of ethnic identities in society is endogenous

to changes in public opinions and discourse" (p. 128). The theory of EP as a cascade can arguably be very influential, as they are "self-reinforcing processes that change the behavior of people through interpersonal dependencies" (p. 129). The theory's application to additional case studies can be of use to examine how persuasive language and propaganda trigger cascades of individual reactions, and how these can lead to rapid and massive polarization of ethnic identities.

3.3 Media Framing and Agenda Setting

Additionally, applying the notion of media framing and agenda setting laid out by Scheufele and Tewksbury (2007) can aid in analyzing the role of propaganda in influencing the perpetration of mass murder during civil conflicts. The framework of agenda setting refers to "the idea that there is a strong correlation between the emphasis that mass media place on certain issues and the importance attributed to these issues by mass audiences" (p. 11). Thus, the agenda setting theory aims to provide a deeper understanding of the media's influential role in shaping public attitudes and behaviors during periods of conflict and mass violence. Media framing on the other hand is based on the assumption that "how an issue is characterized in news reports can have an influence on how it is understood by audiences" (p. 11).

Regarding the agenda setting theory, the use of news outlets as a propaganda tool can set the agenda by emphasizing certain characteristics or actions of a minority group, influencing public perceptions and attitudes towards them. Through agenda setting, propaganda tools can prioritize certain topics or issues that frame the minority group in a negative light, fostering prejudice and hostility within the population. Media framing may involve categorizing the minority group in derogatory terms, intensifying in-group and out-group classifications, establishing an "us versus them" narrative to fuel EP (Scheufele and Tewksbury, 2007, p. 13).

Additionally, the language used in propaganda can frame minority groups as a threat or enemy, using persuasive language to propagate negative stereotypes and in some cases, dehumanization. As tensions escalate, the language used by propaganda outlets may intensify and become more frequent, as it has been the case for Rwanda, Croatia, and Nazi Germany, to name a few. This not only contributes to the escalation of conflict against minority groups, but potentially violence as well, as observed in other cases. Moreover, the language employed may aim to deepen divisions and cement the perception of the minority group as a threat, ultimately influencing the population to perpetrate atrocities against them (p. 15). Overall, the application of agenda setting and media framing frameworks helps to understand how propaganda tools manipulate public perceptions, reinforces prejudices, and contributes to the perpetration of violence against minority groups in cases such as Nazi Germany, Croatia, Rwanda, and other instances of ethno-political conflict.

Instances where media framing and EP are a common and growing issue exist in Kenya (Omoke, et. al., 2020, p. 1). The authors delve into the use of media frames in EP during general elections. Due to conflicts in Africa being attributed to religious, political and ethnic differences, the government-led media takes advantage of these issues to aggravate issues and provide negative coverage and misplaced social mobilization (p. 2). This is also the case in other African countries, such as in Rwanda, South Sudan, Egypt, inter alia (p. 2). Political unrest continues due to the propagation of hate speech and ethnic discrimination, with political figures frequently making divisive statements through various mass media outlets in Kenya, including newspapers, radio, and television. As theorized above, media framing is "a mechanism of influence in which journalists employ a frame of confrontation in presenting an issue to the public" (p. 3). This means that media reporting involves actively shaping and presenting information to shape a specific understanding of reality for the public. As the study's findings show, polarization manifested

through hate speech, derogatory language, name-calling and stereotypes against ethnic groups in Kenya (p. 8). Thus, it is clear that media outlets have leverage to shape the audience's perceptions, contributing to EP and increasing the intergroup divide.

4. Case Study: Rwanda

In order to understand the intricate dynamics of media manipulation in ethnic conflicts controlled by a majority elite, and particularly how language is used in the content of such media, a case study of Rwanda during the genocide in 1994 will be conducted. Rwanda presents a compelling case study due to its historical context and its relevance to the exploration of the media's role in EP and conflict. Based on the literature and theory provided, questions arise regarding how the use of language in government media is able to persuade the population to perpetrate atrocities, and how they are able to deepen the in-group vs out-group categorizations, deepening the country's EP.

4.1 Historical Context

During the colonial period, socio-economic gaps among two ethnic groups emerged between the Tutsis and Hutus. This can arguably be because Belgian colonizers showed preferences for Tutsis due to their physical resemblance to Europeans (Newbury, 1998, pp. 9-11). Consequently, Tutsis were granted exclusive access to administrative positions, which Hutus lacked, leading to an out-group denigration of Tutsis. (pp. 9-11). Although Tutsis were historically the ruling elite, once they gained independence from Belgium in 1962, Rwanda became a “Hutu-dominated 1-party state” (Yanagizawa-Drott, 2014, p. 1952). After independence, numerous incidents of violence erupted between ethnic groups, resulting in Tutsis seeking refuge in

neighboring countries. However, in 1990, a Tutsi-led rebel army invaded Rwanda, calling themselves the Rwandan Patriotic Front (RPF), demanding an “end to the ethnically unbalanced policies Rwanda had been practicing” (p. 1952). Due to its historical significance, EP and influence of media, Rwanda provides a unique and relevant context to examine the research question. The combination of direct and indirect rule fostered the idea of Tutsi superiority over the Hutu, hardening resentment of each ethnic group for the other (Blouin and Mukand, 2019, p. 1014).

4.2 Radio Broadcasts in Rwanda:

Two radio stations predominated the pre-genocide and genocide periods, namely Radio Rwanda and the RTLM. The RTLM particularly provided “the most extreme and inflammatory messages” (Yanagizawa-Drott, 2014, p. 1953). Newspapers were also in use, but their circulation and readership were limited in rural areas due to “low literacy rates” (p. 1953). Therefore, radio stations were the only source of news for Rwandans when the genocide took place.

The RTLM was established by proponents of Hutu power, with substantial support from President Habyarimana until his assassination (Yanagizawa-Drott, 2014, p. 1953). Ferdinand Nahimana, who oversaw mass media regulation, played an instrumental role in the RTLM’s inception, as he would actively aid in shaping its content, crafting editorials and providing journalists with scripts. This underscored a nexus between the station and high-ranking government figures well before the genocide. Following the pivotal day of April 6th, 1994, the RTLM became the mouthpiece of the new regime, where the Hutu Power operatives took control. The broadcasts persisted unabated throughout the genocide until mid-July 1994, until the RPF rebels assumed authority (pp. 1953-1954). During the genocide, the radio station called for “the extermination of the Tutsi ethnic group” and claimed that preemptive violence against it was a

response necessary for “self-defense” (p. 1954). Moreover, the RTLM explicitly expressed that the new government had “no intention of protecting the Tutsi minority”, and that the Hutus engaged in killings would “not be held accountable” (p. 1954). Rather, the RTLM and government officials openly encouraged the killing of Tutsis.

Due to the nature of the RTLM’s content, its transcripts will be used to conduct a QCA. Radio Rwanda, however, experienced a period of inactivity during the initial weeks of the genocide, due to internal power struggles (Li, 2004). Moreover, Radio Rwanda generally refrained from disseminating anti-Tutsi propaganda to the extent observed in RTLM. Thus, only the transcripts from the RTLM will be studied, as Radio Rwanda does not directly aid in answering the research question. Additionally, qualitative research by Straus (2007), based on interviews with perpetrators, suggests that RTLM played a role in prompting acts of violence, mobilizing key figures, coordinating elites, and reinforcing local messages of violence. Despite this “qualitative and anecdotal evidence”, the extent to which these broadcasts directly contributed to the violence remains uncertain (p. 1955).

Additionally, it is unclear how the RTLM or the Hutus (who were financing the RTLM) refer to the Tutsis and what sort of propaganda they spread. More specifically, another question that arises is what language they used to convince the population to perpetrate such atrocities. The categorization of Tutsis in the broadcasts and their designation as enemies is a question that must be investigated to assess how media influences behavior. Due to the ethnically polarized context of the genocide, it is necessary to find what kind of arguments and language they disseminated to deepen the already existant EP in Rwanda. Scholarly research reveals that there is only qualitative evidence to show such effects, however quantitative evidence is lacking in this domain. Therefore, QCA on the language used by radio broadcasts is a significant gap in research (Yanagizawa-Drott,

2014). Quantitative research will allow to measure the frequency and intensity of dehumanizing language targeting Tutsis, examining shifts in language patterns before and during the genocide to understand the propaganda techniques and persuasive strategies employed to degrade perceptions of Tutsis.

Thus, this study seeks to address a significant gap in research by quantitatively examining the language employed by Radio Télévision Libre des Mille Collines (RTLM), particularly by Hutu financiers, to characterize Tutsis and propagate persuasive language and propaganda leading to mass violence against them during the Rwandan genocide. It seeks to analyze how rhetoric against Tutsis evolved, and how they were categorized and designated as enemies through linguistic arguments and rhetoric. Additionally, the study investigates whether there was a progression in the intensity and frequency of dehumanizing language, such as labeling Tutsis as "cockroaches" or "vermin," before and during the genocide, aiming to discern evolving patterns in linguistic tactics over time.

Drawing on the literature, theory and historical context of Rwanda laid out above as well as the existing gaps in research, the following research question arises: *How did the use of language towards the Tutsi minority group in the RTLM broadcasts change throughout the Rwandan genocide?* Moreover, based on the previous work, it can be hypothesized that the strategic use of propaganda will contributed to the escalation of negative and dehumanizing language against the Tutsis as the Rwandan genocide unfolded, perpetuating intergroup animosity.

5. Conceptualization and Operationalization

How can language be categorized in order to determine how the RTLM refer to Tutsis, and what sort of persuasive language and propaganda do they spread in order to have perpetrated mass murder against Tutsis? Based on the literature and theoretical framework, it can be assumed that there was a predominant in-group and out-group categorization, framing the Tutsi minority group as enemies. Not only that, but also the language used in the broadcasts might unveil certain patterns on how this intergroup dynamics unfolded, as well as how EP aggravated.

5.1 Language: Dehumanization and Derogatory Discourse

Previous research on dehumanization has mainly focused on two main areas: the "denial of human attributes to groups", known as "attribute-based dehumanization" (ABD) and the comparison of group members to non-human entities, coined as "metaphor-based dehumanization" (MBD) (Loughnan, Haslam and Kashima, 2009, p. 747). Within the framework of ABD, scholars have investigated how human features were attributed differently to members of the in-group versus the out-group. The refusal of acknowledging unique human characteristics to out-group members was interpreted as an indication of subtly perceiving them as less human than members of the in-group (p. 748). Moreover, Leyens et al (2007) posit that infrahumanization involves the perception of one's in-group as "fully human" while viewing out-groups as "less human" and more akin to animals (p. 140).

5.2 Hate Speech and Intergroup Relations

A large body of scholarly research has also focused on the use of derogatory language towards minority groups, which can lead to political radicalization and subsequently deteriorate

intergroup relations (Bilewicz and Soral, 2020, p. 3). Furthermore, according to their research, people's exposure to hate speech "has had the tendency to engage in acts of intergroup violence and/ or political radicalization" (p. 4). Hate speech, defined by the Cambridge Dictionary as "public discourse expressing hostility or inciting violence against individuals or group-based on characteristics such as race, religion, sex or sexual orientation", presents definitional challenges (Hate speech, n.d.). According to Bilewicz and Soral (2020), it is suggested that hate speech may lead to "out-group avoidance and discrimination", and these findings are supported by subsequent studies (p. 5). For instance, exposure to "derogatory ethnic labels" prompts individuals to selectively retrieve and reconstruct information about professionals of the targeted ethnicity, ultimately leading to negative evaluations (p. 5). Notably, the effects of "derogatory language are specific to ethnic-related labels", indicating the activation of negative ethnic stereotypes (p. 5).

Further research corroborates the authors' progression model, indicating that hate speech not only fosters avoidance but also contributes to discriminatory behaviors (p. 5). Synthesizing existing evidence and theories, it can be postulated that hate speech may culminate in discrimination and the use of dehumanizing language, exacerbating intergroup divisions.

5.3 Hate Speech, Genocide and Ethnic Polarization:

Hate speech and genocide are two intertwined phenomena characterized by the deliberate transformation of out-group stereotypes, often orchestrated by political propagandists during genocidal periods. This is because the proliferation of ethnic stereotypes can often be used as a tool for the perpetrators of genocide (Bilewicz and Soral, 2020, p. 12). As discussed before, Loughnan, Haslam and Kashima (2009) presented the framework of ABD, and Bilewicz and Soral (2020) also argue that "when a contemptuous stereotype of a group is activated, people cease to

consider members of such groups as equally human, and this effect can be observed at a very basic level of neural encoding" (p. 12). Similar to the case of Nazi-Occupied Poland, the anti-Jewish posters showcased during the regime tended to attribute Jews as "vermin, rats and lice", connecting them to "typhus and other diseases" (p. 12).

These occurrences have taken place before, as laid out in the previous sections. For example, Landry and Mere (2022) investigated the dehumanization of Jews in Nazi propaganda through an examination of shifts in the attribution of mental states to Jews before and after the Holocaust. Additionally, it also determined whether broader changes in language concerning mental states contributed to the observed outcomes. In investigating dehumanization, they analyzed the portrayal of negative emotions in the propaganda material. This examination aimed to discern whether observed trends in mental state terminology were influenced by overall negative sentiment, as there are concerns that dehumanization may primarily manifest as an expression of negative affect. Moreover, they assessed language indicative of a desire for social connection in the propaganda.

6. Methodology

The paper aims to answer the research question conducting QCA. In order to do so, Python's Valence Aware Dictionary and Sentiment Reasoner (VADER) lexicon and rule-based Sentiment Analysis (SA) tool will be utilized (Hutto and Gilbert, 2014). Conducting SA with VADER is a useful tool, as it will determine the sentiment or tone of the language used by the RTLM towards the Tutsi minority group. VADER "uses a dictionary of words and rules to determine the sentiment of a piece of text" (Geetha, 2023). VADER's valence score is measured on a scale, ranging from -4 (most negative) to +4 (most positive), where a neutral sentiment score

would be equivalent to 0. The tool can help identify the persuasive and dehumanizing language used to incite violence against the Tutsis. Moreover, the tool can provide insights into the intensity of dehumanizing language. Additionally, in order to quantify the use of language, a frequency of the most derogatory terms according to the conceptualizations will be analyzed with Python's tokenizing and counting built-in tools. Thus, by conducting a QCA of the transcripts, SA can aid in understanding the patterns and changes in the language used to categorize and designate Tutsi as enemies and to dehumanize them, as well as out-group categorizations and EP.

6.1 Data

The data analyzed will be the transcripts available from the Radio Télévision Libre des Mille Collines (RTL) which was utilized as a prominent propaganda tool during the genocide. All transcripts were obtained from the Concordia University website, particularly from the Montreal Institute for Genocide and Human Rights Studies (Rwanda Radio Transcripts, n.d.). There are 35 transcripts available in English, so all 35 will be used, accounting for 496 pages. The transcripts are analyzed in chronological order, starting from November 24th 1993 until July 3rd 1994. Rwanda suffered a critical juncture during this period, namely April 4th, 1994 when the genocide began.

6.2 Pre-processing Data

Some of the transcripts did not recognize text, therefore an optical character recognition (OCR) tool was employed in order to transform them into JavaScript Object Notation (JSON) files, for optimal preprocessing. The transcripts were fine-tuned and preprocessed to eliminate any irrelevant words/ sentences, such as the name of the translator, the title of the transcript, inter alia.

Once the transcripts were loaded into the program, all words were converted into lowercase in order to ensure consistency throughout the text, preventing discrepancies that may arise from variations in letter casing. Secondly, it allows to simplify the data, enhancing computational efficiency by collapsing words with different cases into a single representation. Lowercasing serves as a crucial preprocessing step that enhances the accuracy and reliability of SA results.

6.3 Sentiment Analysis (SA)

After lowercasing the transcripts, the text was split into sentences and SA was conducted for each and every one of these sentences by tokenizing the text. Then, an average sentiment of each transcript was calculated (Appendix A). This originally proved inefficient. Certain words were not properly picked up with negative sentiment in the context of the genocide. For example, the words "dogs", "vermin", "cockroaches", "inyenzi", etcetera were given a neutral compound score. Below are some examples from before preprocessing and after preprocessing.

Table 1: Comparison of Sentiments before and after pre-processing

Sentence	Sentiment before pre-processing	Sentiment after pre-processing
These include the Prime Minlstar and other "cockroaches" (July 3, 1994; RTLTM, 1994).	0.0	-1.8
Rugglu accuses the “cockroaches Inkotanyl® of shelling civillansan.d claims that their objective Is to kill people if they do not succeed in taking Kigall (July 3, 1994; RTLTM, 1994).	-0.8667	-3.6
You heard the testimony of people, that they come barking like dogs. (May 30, 1994; RTLTM, 1994).	0.3612	-0.9

They are now aware of the wickedness of the Inyenzi-Inkotanyi, and we have not stopped talking about it. (May 30, 1994; RTL, 1994).	-0.3472	-3.6
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As shown above, although the words "cockroach", "dogs" or "inyenzi" are considered dehumanizing and derogatory language in the context of the genocide, the algorithm is unable to assign the corresponding values. This can be due to VADER's inability to assign negative sentiment to words where the lexicon lacks context. Therefore, it is important to know the context of the Kinyarwanda key terms used during the genocide. As Ruzindana (2012) states the effect of language during the Rwandan genocide was "lethal" (p. 146). By 1994, "a number of Kinyarwanda terms had acquired new extended or broader meanings to accommodate the numerous new realities", explaining why "some of the extended meanings of keywords" in the radio transcripts cannot be found in Kinyarwanda dictionaries (p. 147). For example, the term *Inyenzi* meant cockroach, used by the Hutus to dehumanize Tutsi by framing them with this derogatory term (p. 148). To further understand the complexity of this term, Ruzindana (2012) examines the polysemic nature of the term. It was shown that the term *Inyenzi* was associated with "cockroaches", but also to frame the Inkotanyi, Tutsis in general and Hutus opposed to the regime (p. 154). Thus, the word *Inyenzi* acquired a "pejorative and derogatory connotation" and was used by Hutu extremists (p. 155). Moreover, "the words *Inyenzi*, *Inkotanyi*, *enemy* and *accomplice* were closely associated with the Tutsi ethnic group" (p. 153). Additionally, other words such as "dogs", "vermin", "nihilist" and others (see Table 2) also contained derogatory sentiments in the context of the transcripts, so their sentiment has been modified prior to coding. Therefore, after creating the categorizations, the sentiment values were changed to -0.9 for these words. Thus, the column showing the modified sentiments show a more negative compound score than those on the left.

Having laid out the operationalization and conceptualization in section 5, as well as a more specific context into the genocide, words that can be identified as EP, dehumanization and explicit violence were filtered to effectively conduct SA using VADER.

Table 2: Categorizing Language from the RTLTM Transcripts

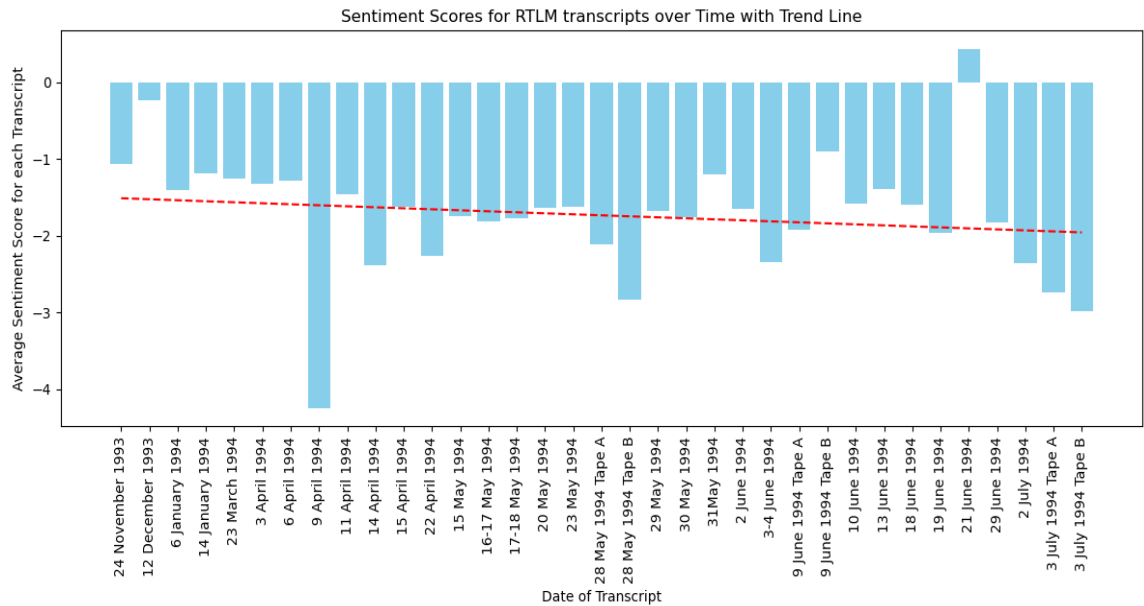
1. Dehumanizing Language	- Cockroaches/ cockroach - Vermin - Dogs/ dog - Cannibals/ cannibal - Unfit - Inyenzi (in Kinyarwandan, it means cockroach)/ inyenzis - Inhumane - devil/ devils - dare-devil/ dare-devils
2. Hate speech: violence and killing	- Extermination/ exterminate - Combat - Kill/ Killed - Massacre - Atrocities/ atrocity - Murder/ murders - Afraid - Die/ Death/ Dying - Extermination - Wipe out - Genocide - Slaughter - Violation - Rid/ rid of - Oppression
3. EP, in-group vs out-group categorization, others	- Lies - Propaganda - Anti-tutsi/ Anti-tuts/ Anti-tutsI - Criminal/ Criminals - Opposition

	- RPF (Hutu opposition) - Inkotanyi (derogatory term for Tutsis used by Hutus) - Nihilist/ nihilists
--	--

Based on the theory and the conceptualizations, words were carefully selected in order to identify the words which are attributed to dehumanizing language, hate speech and EP. According to the ABD framework and to the theory of infrahumanization (Loughnan, Haslam and Kashima, 2009; Leyens, et. al., 2007), dehumanizing language characterizes the out-group as less human and more akin to animals. Thus, words such as "dogs", "cockroaches", "inyenzi", etcetera all can be categorized as dehumanizing language (as seen in table 2). Moreover, the second category involves such language that can be considered as hate speech and explicit violence and killing. These words not only contribute to political radicalization but also encourage intergroup violence. The words "kill", "murder", "exterminate", etcetera all fall within this framework, aligning with the theory and conceptualizations laid out prior. The last category encompasses any terms explicitly indicating polarization, such as "opposition", "anti-Tutsi", inter alia. Additionally, it involves other key terms that do not directly fall into the previous two categories, but can still be considered as relevant to answering the research question.

7. Findings and Analysis

Figure 1



Once all files were appropriately preprocessed and filtered, the average sentiment for all transcripts were compiled in the bar chart, as seen in Figure 1. The trendline suggests that the sentiment decreases over time, aligning with the theory laid out prior. Thus, it is evident that there is an increase in negative language as the genocide unfolds, and the language towards Tutsi becomes more derogatory. The average sentiment on the first day of the recorded transcript (November 24th, 1993) was -1.06214285714285743. On the other hand, the average sentiment from the last two tapes on July 3rd 1994 was of -2.7454545454545463 for Tape A, and -2.9772470588235296, Tape B (RTLM, 1994).

These results, along with the bar chart given above show notable changes in sentiment, and an increase in negative sentiment as the genocide unfolded. The scores are exceedingly negative, approaching the negative end of the scale of -4, as previously mentioned. These scores indicate a pervasive pattern of highly negative sentiment embedded in the content of the transcripts. The

drastic negativity suggests a deliberate use of language aimed at dehumanizing the minority group. The consistency of such markedly negative sentiment across the duration of the broadcasts underscores the sustained and concerted effort to propagate hate speech and enhance interethnic animosity, contributing to negative perceptions of Tutsis.

Moreover, certain outstanding cases such as April 9th 1994 must be looked at more closely. The genocide broke out on April 7th, 1994, right after assassination of Habyarimana on the previous day (Abimbola and Dominic, 2013). Being this the transcript right after his assassination, violence increased significantly as depicted in the transcripts. Taking a closer look at the transcript, a large number of sentences which carried negative sentiment spoke of this tragic event. Additional sentences with negative sentiment demonstrate hatred towards the so-called "criminals" which caused this assassination (RTL, 1994). On the other hand, the transcript on the 21st of June appears to be the only one with positive sentiment. Looking at the transcript more closely, it is only 2 sentences long, thus there were not enough words to analyze sentiment in comparison to the rest.

Figure 2

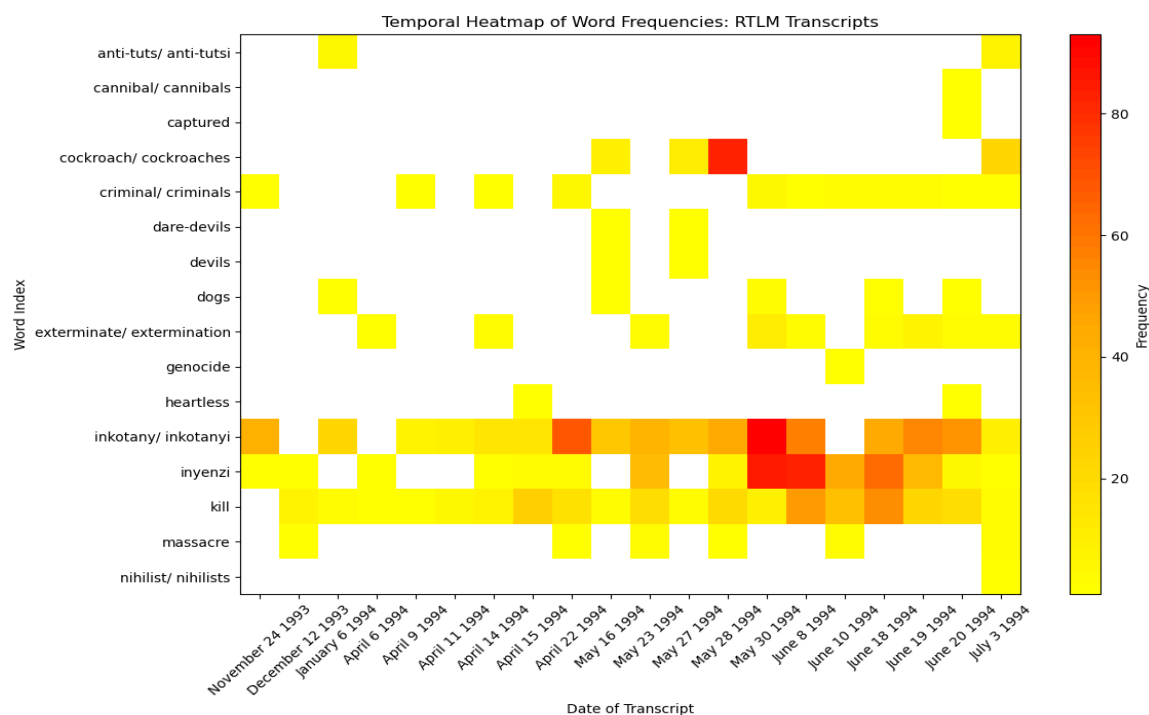


Figure 2 shows a temporal heat map of word frequencies, specifically words that can be attributed to ABD but also those considered to be dehumanizing, hate speech and ethnically discriminatory in the context of the Rwandan genocide. The heat map provides a visual representation of how these specific words change over time. In this case, the words “cannibal”, “cockroach”, “extermination”, etcetera were used to dehumanize the Tutsi ethnic group during the genocide. Not all transcripts are included for easier visualization. Those transcripts which contained only a few sentences were removed, and the graph depicts an overall simplified trend (see Appendix E for the full heat map).

The increase in frequency of the selected words over time indicates a disturbing trend of escalating hate speech and propaganda targeted at the Tutsi population. As the genocide progresses, the heightened frequency of these dehumanizing words reflects the intensification of

efforts to demonize and marginalize the Tutsi community. Thus, the heatmap allows to show how language was utilized in the RTLM broadcasts as a tool of oppression and incitement to violence during this tragic period in Rwandan history.

It is evident that the frequency of the words increase as the genocide unfolds, as the colors become darker in the heat map. A significant amount of negative language appears to be concentrated from the end of May onwards. First, the transcript is 19 pages long (combining Tape A and Tape B from the same day), proving to be covering more content than other transcripts. Violence had escalated significantly, and hate speech increased as figure 1 depicts. Taking a closer look at the transcript on May 28th 1994, the content reveals some answers as to why the heatmap displays such a high frequency of negative language. The word "cockroach" for example is used a total of 44 times as well as 38 instances for "cockroaches", among others. The transcript on May 30th proves to be similar in content. There are 93 instances for the derogatory term "inkotanyi", and 85 for "inyenzi" (See Appendix D for the list of frequencies). Examining specific events that took place in May 1994, several explanations as to why hate speech increased exist (Kirschke, 1996, pp. 65-89). On May 30th, the systematic killing of Tutsi continued unabated, with massacres in various regions (Kiley, 1994). Eyewitnesses highlighted the efficiency of the killings, conducted by the Interahamwe militia using machetes and small arms (Kirschke, 1996, pp. 65-89). Around this time period, diplomatic discussions were ongoing about the possibility of reinforcing the United Nations Assistance Mission for Rwanda (UNAMIR) with a stronger mandate (pp. 65-89).

Moreover, when looking into specific examples such as the word "inyenzi", it appears to be infrequently used before the genocide. However, from May 23rd onwards, the frequency intensifies even reaching a frequency of over 80 mentions per transcripts, as mentioned. This is

directly associated with hate speech against Tutsi, such as “cockroaches”, “Inkotanyi”, “enemy”, “RPF”, “atrocities”, “fighting”, “fight” and other violent language. The size of the words in the cloud depicts the frequency, and clearly the derogatory Terms in figure 4 stand out in comparison to the rest. Additional words such as “anti”, “fight” and other negative words can be associated with “Tutsi” when encompassing the context of the transcripts, providing deeper insights into the rhetoric and propaganda strategies employed by the RTLM.

8. Discussion

The previous section discusses the findings consistent with the research topic. According to Halperin and Heath (2020, p. 365), the “aim of QCA is to draw inferences about the meaning and intention of a text through an analysis of the usage and frequency of words, phrases, and images, and the patterns they form within a text”. The previous section encompasses the findings in accordance with this research method's aim.

As Yanagizawa-Drott (2014) argues, “QCA on the language used by radio broadcasts is a significant gap in research” (p. 1948). There seems to only be qualitative evidence to show such effects, and quantitative evidence is lacking in this domain. By conducting QCA, frequency and intensity of dehumanizing language targeting Tutsis has been effectively measured, examining shifts in language patterns before and during the genocide to understand the propaganda techniques and persuasive strategies employed to incite violence against the Tutsi population. Not only allows to analyze a vast amount of text in comparison to qualitative content analysis, but also One of the main advantages is the inherent nature of the content reduces bias (Halperin and Heath, 2020, p. 374).

In accordance with SIT, the use of language in the broadcasts contributed to the construction and delineation of distinct social categories, notably the stark division between the two ethnic groups (Roozen and Shulman, 2014). The broadcasts leveraged language and propaganda to exacerbate intergroup divisions, fostering a sense of in-group solidarity among Hutus whilst dehumanizing the Tutsis as the outgroup, thus maximizing the meta-contrast principle (Tajfel, 1959; Roozen and Shulman, 2014, p. 166). As the genocide unfolded, the language became increasingly negative towards Tutsis, aligning with the predictions of social identity theory, which posits that such processes serve to heighten in-group cohesion and out-group derogation during intergroup conflicts. These dynamics amplified ethnic polarization, contributing to the escalation of violence and mass atrocities against the Tutsi minority.

Moreover, aligning with Somer's (2001) theory on EP as cascades, findings suggest that the use of persuasive language and propaganda to trigger cascades of individual reactions that led to rapid and massive polarization of ethnic identities can be applied to this case study. The dehumanizing language and derogatory labels used against the Tutsis served to create a divisive image of ethnic identities, leading to a critical mass of individuals who supported the portrayal of Tutsis as enemies and as an out-group. This, in turn, intensified the polarization of ethnic identities within Rwandan society. As the language became more frequent and intense, it contributed to the self-propagating nature of polarization, where the divisive image gained widespread support, ultimately fueling the mass violence and atrocities committed against the Tutsis during the genocide.

Additionally, the notions of media framing and agenda setting laid out by Scheufele and Tewksbury (2007) can be used to explain how the RTLM's language and persuasive propaganda framed and demonized the Tutsi. In accordance to their framework, this established in-group and

out-group categorizations, intensifying in frequency and intensity as the genocide unfolded. The government-controlled radio station played a significant role in "setting the agenda" by emphasizing the demonization of Tutsis and framing them as enemies of the state. Furthermore, Media Framing theory according to the authors suggest that the language used by the RTLM framed the Tutsis in a dehumanizing and "othering" manner. This framing of Tutsis as "cockroaches" or "vermin" exemplifies the use of language to create an in-group and out-group categorization, intensifying the EP in Rwandan society. The propaganda spread through the RTLM used persuasive language and dehumanizing propaganda to convince the population to perpetrate mass murder against Tutsis. The language used against the Tutsis intensified and became more frequent as the genocide progressed, contributing to the dehumanization and demonization of the Tutsi population. The distinct shift in language use before and during the genocide reflects the power of media framing in shaping public perceptions and attitudes towards the Tutsis, ultimately contributing to the tragic events of the Rwandan genocide. Furthermore, as the theory literature on persuasive communication suggests, the exposure to mass media can influence behavior by shaping beliefs and/ or preferences (Yanagizawa-Drott, 2014, p. 1955). Because the RTLM was financed by the government and armed forces, it garnered credibility among listeners, serving as a conduit for the official policies and agendas of the ruling elite; effectively conveying the active persecution of Tutsis (pp. 1955-1956). Generally, there is evidence pertaining that mass media can impact conflict, and violence targeting an ethnic minority during a genocide in particular.

Overall, the theories and frameworks laid out prior can be applied to understand the RTLM's influential role in shaping public attitudes and behaviors during the Rwandan genocide, and how hate speech and dehumanizing language increased as the genocide unfolded.

9. Conclusion

Having chosen the Rwandan genocide as a case study, it is observed that the use of language towards the Tutsi minority group in the RTLM broadcasts underwent significant evolution, reflecting the escalating intensity of propaganda and incitement of hate speech, derogatory and dehumanizing language. Initially, the language employed by the RTLM broadcasts portrayed the Tutsi population as a threatening and dehumanized “other”, employing insidious rhetoric to foment fear and hatred against them. Nonetheless, this was not a discerning pattern at the start of the transcripts, and the content was mainly political and not directed to Tutsis, as seen in the word clouds. As the genocide unfolded however, the language employed became increasingly virulent, employing dehumanizing terms such as “cockroaches” and “verming” to vilify and delegitimize the Tutsi minority. The broadcasts not only reinforced the in-group and out-group categorization, framing Tutsis as enemies, but also intensified the frequency of dehumanizing and derogatory language, contributing to the demonization of Tutsis. In order to visualize such findings, a temporal heatmap was provided, as well as the average sentiment of the broadcasts over time. This progression in language tactics over time underscored the deliberate and systematic nature of propaganda techniques utilized by the RTLM to intensify interethnic animosity against Tutsis. QCA deemed ultimately crucial to comprehensively understand the patterns of linguistic manipulation, propaganda strategies and the progression of language tactics used to propagate violence against the Tutsis during the Rwandan genocide.

In conclusion, the analysis of the evolution of language towards the Tutsi minority group in the RTLM broadcasts during the Rwandan genocide sheds light on the deliberate and systematic nature of propaganda and incitement to violence through media.. By addressing this research question, the study elucidates the critical need for quantitative content analysis to comprehensively

examine the patterns of linguistic manipulation and propaganda strategies employed by media outlets during periods of conflict. The findings not only contribute to a deeper understanding of the dynamics between media, language, and intergroup conflict but also hold implications for preventing and mitigating the dissemination of hate speech and propaganda in other socio-political contexts. This research underscores the enduring relevance of understanding the power and impact of media in shaping intergroup relations and perpetuating hate speech quantitatively.

9.1 Limitations, Future Research and Policy Implications

Python is a powerful programming tool to conduct large-scale text analysis in comparison to qualitative content analysis, promoting transparency, replicability and collaboration within academia. Its flexibility allows for a more custom analysis, while other quantitative tools such as SPSS offers limited options for text analysis. Nonetheless, there are some limitations to the research. SA algorithms may not always accurately capture the nuances of language, especially in the context of hate speech and propaganda. This is why some words' sentiments were manually modified, but it could exhibit inherent biases in its lexicon and alter the results.

Regarding the data in itself, the transcripts analyzed may not be fully representative of all anti-Tutsi propaganda during the genocide. Other sources of propaganda such as newspapers, magazines, inter alia can be used for future research. Furthermore, because transcripts were translated from Kinyarwanda to English, nuances and cultural meanings may be lost in translation, impacting the accuracy of results. Additionally, the data was not always homogeneous, as some transcripts barely had any text. For example, on May 31st 1994, the transcript only had 2 sentences.

Employing a mixed-methods approach complementing quantitative and qualitative content analysis or discourse analysis can be potential extensions of this research. Although learning the

sentiment is useful, it does not necessarily indicate the latent meaning and further categorizations could be useful using qualitative methods. These can provide deeper insights into underlying meanings, rhetorical strategies and discursive practices employed by the RTLM. Regarding EP in Rwanda, it is crucial to understand the broader contextual factors that influence ethnic perceptions, as historical grievances between Tutsi and Hutus rooted in colonial legacies were predominant throughout this time period. Although this paper has briefly touched upon the importance of this historical context, a more extensive understanding might be a consideration for future research. By addressing these limitations and pursuing these avenues for future research, it is possible to deepen the understanding of the role of radio broadcasts and its language in propagating hate speech and EP during the Rwandan genocide.

Nonetheless, Rwanda only represents one example of many cases where propaganda was used to fuel hate speech and interethnic discrepancies. Future research should therefore expand on other countries where minority ethnic groups were dehumanized through discourse and propaganda. Additionally, further propaganda tools may be analyzed and not a single media outlet as the RTLM, in order to offer more valuable insights for the purpose of this paper.

Moreover, the findings hold crucial implications for the regulation and oversight of media, particularly in conflict-prone regions. As media and other propaganda outlets gain prominence alongside social media, this topic is highly relevant in the realms of social and political sciences. Understanding the power of language in shaping intergroup dynamics underscores the necessity for robust policies aimed at preventing the dissemination of hate speech and incendiary propaganda. Policy interventions could focus on media literacy programs, regulatory frameworks

to monitor inflammatory content, and international cooperation to mitigate the impact of contentious media during conflicts. Additionally, the research suggests the need for diplomatic efforts to promote peacebuilding, reconciliation, and the fostering of inclusive and tolerant societies. These policy initiatives can contribute to fostering stability and peace in regions vulnerable to intergroup tensions.

Appendix

Appendix A

Average Sentiment Analysis Score (ASAS) without preprocessing:

1. ASAS Transcript 24 November 1993: -0.02535160256410259
2. ASAS Transcript 12 December 1993: 0.0041613475177305174
3. ASAS 6 January 1994: 0.022875149700598795
4. ASAS Transcript 14 January 1994: 0.05955174672489084
5. ASAS Transcript 23 March 1994: -0.024618807339449517
6. ASAS Transcript 3 April 1994: -0.08324168336673345
7. ASAS Transcript 6 April 1994: -0.4546
8. ASAS Transcript 9 April 1994: 0.1592990476190477
9. ASAS Transcript 11 April 1994: 0.04094160305343512
10. ASAS Transcript 14 April 1994: -0.03547589285714286
11. ASAS Transcript 15 April 1994: -0.04282183235867447
12. ASAS Transcript 22 April 1994: 0.011251204819277126
13. ASAS Transcript 15 May 1994: -0.13730939849624063
14. ASAS Transcript 16-17 May 1994: -0.02669207547169809
15. ASAS Transcript 17-18 May 1994: -0.0713407718120805
16. ASAS Transcript 20 May 1994: -0.012800000000000002
17. ASAS Transcript 23 May 1994: -0.03067902097902095
18. ASAS Transcript 28 May 1994 Tape A: -0.159670987654321
19. ASAS Transcript 28 May 1994 Tape B: -0.07117395833333331

20. ASAS Transcript 29 May 1994: 0.08787457627118642
21. ASAS Transcript 30 May 1994: -0.08978063973063981
22. ASAS Transcript 30 May 1994: 0.0577
23. ASAS Transcript 2 June 1994: -0.16481428571428572
24. ASAS Transcript 03/04 June 1994: -0.25872500000000004
25. ASAS Transcript 9 June 1994 Tape A: -0.03815247747747751
26. ASAS Transcript 9 June 1994 Tape B: -0.23976000000000003
27. ASAS Transcript 10 June 1994: -0.05915908045977015
28. ASAS Transcript 13 June 1994: -0.06594896265560168
29. ASAS Transcript 18 June 1994: -0.08357704728950408
30. ASAS Transcript 19 June 1994: -0.07007307692307699
31. ASAS 20 June 1994: -0.08039878787878788
32. ASAS Transcript 21 June 1994: 0.4375
33. ASAS Transcript 2 July 1994: -0.12863846153846156
34. ASAS Transcript 3 July 1994 Tape A: -0.06766709265175716
35. ASAS Transcript 3 July 1994 Tape B: -0.009754081632653058

Appendix B

Average Sentiment Analysis Score (ASAS) WITH preprocessing:

1. ASAS 24 November 1993: -1.06214285714285743
2. ASAS 12 December 1993: -0.23376623376623382
3. ASAS 6 January 1994: -1.409999999999993
4. ASAS 14 January 1994: -1.181927710843374
5. ASAS 23 March 1994: -1.2524475524475545

6. ASAS 3 April 1994: -1.3295454545454553
7. ASAS 6 April 1994: -1.285714285714286
8. ASAS 9 April 1994: -4.2477272727272721
9. ASAS 11 April 1994: -1.4625000000000008
10. ASAS 14 April 1994: -2.3804054054054085
11. ASAS 15 April 1994: -1.6233128834355854
12. ASAS 22 April 1994: -2.2649006622516565
13. ASAS 15 May 1994: -1.7395973154362427
14. ASAS 16-17 May 1994: -1.8118421052631588
15. ASAS 17-18 May 1994: -1.7678571428571421
16. ASAS 20 May 1994: -1.6312499999999999
17. ASAS 23 May 1994: -1.6236000000000004
18. ASAS 28 May 1994 Tape A: -2.110714285714287
19. ASAS 28 May 1994 Tape B: -2.8318965517241397
20. ASAS 29 May 1994: -1.6783783783783779
21. ASAS 30 May 1994: -1.7647686832740204
22. ASAS 31 May 1994: -7.2000000000000001
23. ASAS 2 June 1994: -1.6500000000000001
24. ASAS 3-4 June 1994: -2.34
25. ASAS 9 June 1994 Tape A: -1.9175879396984916
26. ASAS 9 June 1994 Tape B: -0.9
27. ASAS 10 June 1994: -1.58500000000000013
28. ASAS 13 June 1994: -1.3869565217391313

29. ASAS 18 June 1994: -1.5894736842105244
30. ASAS 19 June 1994: -1.9698979591836727
31. ASAS 21 June 1994: 0.4375
32. ASAS 29 June 1994: -1.8315789473684227
33. ASAS 2 July 1994: -2.3625000000000003
34. ASAS 3 July 1994 Tape A: -2.7454545454545463
35. ASAS 3 July 1994 Tape B: -2.9772470588235296

Appendix C

Words used to filter/ change sentiment

abomination annihilation anti-tuts anti-tutsi anti-tutsl atrocities attack cannibal cannibals capture
captured cockroach cockroaches combat control corrupt corrupts criminal criminals dare-devils
devils demoralize despair despicable destroy die dogs ethnic cleansing exterminate exterminated
extermination fear-mongering genocide hate heartless horrendous inhumane inkotany inkotanyi
inyenzi kill killed lie lies manipulation massacre massacres murder murders nihilist nihilists
opposition oppositions perpetrator perpetrators persecute propaganda rid rpf ruthless rwanda
machete slaughter tutsi tutsis unfit vermin vicious war wipe

Appendix D

Frequency used for heatmap (extracted from Python code)

Define the transcripts and their corresponding word frequencies


```

transcripts = {
  "November 24 1993": {
    "criminal": 1, "inkotany": 41, "inyenzi": 1
  },
  "December 12 1993": {
    "inyenzi": 2, "kill": 7, "massacre": 1
  },
  "January 6 1994": {
    "anti-tuts": 3, "anti-tutsi": 3, "dogs": 1, "inkotany": 23, "kill": 3
  },
  "April 6 1994": {
    "exterminate": 1, "inyenzi": 2, "kill": 2
  },
  "April 9 1994": {
    "criminal": 1, "criminals": 1, "inkotany": 8, "kill": 1
  },
  "April 11 1994": {
    "inkotany": 10, "kill": 6
  },
  "April 14 1994": {
    "criminal": 1, "criminals": 1, "exterminate": 4, "inkotanyi": 14, "inyenzi": 1, "kill": 8,
  },
  "April 15 1994": {

```

"heartless": 1, "inkotanyi": 14, "inyenzi": 3, "kill": 26

},

"April 22 1994": {

 "criminal": 3, "criminals": 3, "inkotanyi": 68, "inyenzi": 4, "kill": 17,

 "massacre": 1

},

"May 16 1994": {

 "cockroach": 5, "cockroaches": 5, "dare-devils": 2, "devils": 2, "dogs": 1,

 "inkotanyi": 30, "kill": 4

},

"May 23 1994": {

 "exterminate": 4, "inkotanyi": 39, "inyenzi": 35, "kill": 19, "massacre": 3,

},

"May 27 1994": {

 "cockroach": 8, "cockroaches": 4, "dare-devils": 2, "devils": 2, "inkotanyi": 34,

 "kill": 4

},

"May 28 1994": {

 "cockroach": 44, "cockroaches": 38, "inkotanyi": 44, "inyenzi": 7, "kill": 21,

 "massacre": 1

},

"May 30 1994": {

 "criminal": 3, "criminals": 3, "dogs": 3, "exterminate": 11, "inkotanyi": 93,

"inyenzi": 85, "kill": 10

},

"June 8 1994": {

 "criminal": 1, "criminals": 1, "exterminate": 3, "extermination": 1, "inkotanyi": 57,

 "inyenzi": 82, "kill": 49

},

"June 10 1994": {

 "criminal": 3, "genocide": 1, "inyenzi": 44, "kill": 33, "massacre": 3

},

"June 18 1994": {

 "criminal": 4, "dogs": 1, "exterminate": 3, "inkotanyi": 44, "inyenzi": 62, "kill": 54,

},

"June 19 1994": {

 "criminal": 2, "criminals": 2, "exterminate": 6, "extermination": 1, "inkotany": 56,

 "inyenzi": 36, "kill": 22

},

"June 20 1994": {

 "cannibal": 1, "cannibals": 1, "captured": 2, "criminal": 1, "dogs": 2, "exterminate": 4,

 "heartless": 1, "inkotany": 51, "inyenzi": 6, "kill": 19

},

"July 3 1994": {

 "anti-tuts": 4, "anti-tutsi": 2, "anti-tutsl": 1, "cockroach": 11, "cockroaches": 11,

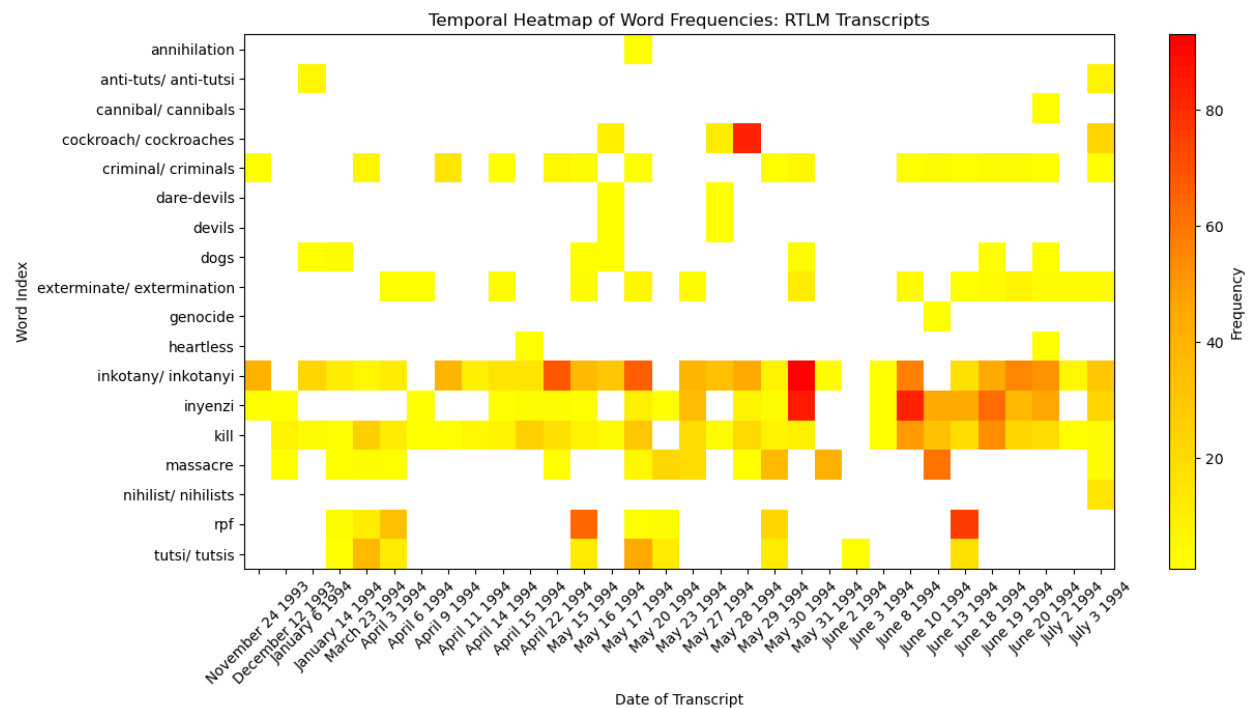
 "criminal": 1, "criminals": 1, "extermination": 3, "inkotany": 10, "inyenzi": 2, "kill": 4,

"massacre": 3, "nihilist": 1, "nihilists": 1

}

Appendix E

Temporal heat map including all transcripts:



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