Hertie School

Master Thesis

From Post to Insight:

Leveraging Natural Language Processing to Analyse Social Inequality Discourse on Telegram

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Executive Summary

This master's thesis analyses the representation of social inequality on the social media platform Telegram, based on the concepts of Steffen Mau et al. (2023), who divide inequalities into four dimensions. The study examines how these dimensions are represented in Telegram communications and whether the theoretically independent arenas merge in practice. Given increasing social polarisation, Telegram serves as a field of research that sheds light on these dynamics. A specialised crawler was used to collect publicly accessible messages from various channels and groups. The analysis was conducted using a zero-shot NLI classifier.

The results indicate that socio-economic and national identity issues mainly dominate the discourse on Telegram. It becomes apparent that the inequality arenas often merge in practice and form a complex syndrome that cannot be clearly separated. This partly contradicts the theoretical assumptions of Mau et al. (2023) about separate arenas of inequality. These findings expand the understanding of social inequality in digital discourses and illustrate the limitations of existing theoretical models. They emphasise the need to consider the interactions of different dimensions of inequality more nuancedly and recommend expanding future research to include other languages, cultural and ideological contexts to place the results on a broader basis. For example, a more left-dominated social media platform could be analysed compared to the results on Telegram.

The study has limitations, including the focus on predominantly English-language posts and possible biases due to the classifier. The cultural diversity of Telegram users could also influence the interpretation. This work offers essential insights into the mechanisms of digitally mediated social inequality and is a valuable resource for those tackling inequalities and promoting justice.

1 Introduction

The increasing polarisation of our society is a central topic of contemporary social science research. Social media and particularly Telegram, which has established itself as an essential medium for exchanging and disseminating information and opinions, offers a rich field of research to gain insights into the discourse and dynamics of this polarisation. They act as a mirror and catalyser of social processes by providing a space for public discussion. This master's thesis is dedicated to the question of how discourses on social inequality are articulated within Telegram and to what extent these discourses reflect the structural dimensions of social inequality identified in sociological research.

In their book "Triggerpunkte", Steffen Mau, Thomas Lux and Linus Westheuser (2023) offer a theoretical framework that categorises social inequality into four main dimensions or "arenas": Top-Bottom, Inside-Outside, Us-Them and Today-Tomorrow. These arenas describe different aspects and mechanisms of social inequality, from economic differences and ethnic and cultural divisions to temporal perspectives on sustainability and shaping the future. The central thesis of this work is to examine whether and how these theoretically defined arenas are represented on Telegram and which dynamics and overlaps can be observed.

To investigate these questions, an extensive number of Telegram posts were collected and analysed. This data comes from a variety of public channels and groups covering a wide range of topics, from political debates to discussions about social values and norms. Using a zero-shot natural language inference (NLI) classifier, the posts were classified according to the four arenas to identify the predominant discourse topics and their relationship to the theoretical dimensions of inequality.

The anonymisation of the data ensured compliance with ethical standards and data protection guidelines to safeguard the integrity of the study and, at the same time, provide deeper insights into the structures of digitally mediated social inequality. This paper is a detailed analysis of the discourses on Telegram, which both tests Mau et al.'s (2023) theoretical concepts and opens up new perspectives on the discourse of social inequality in social media.

1 Literature Review

The book “Triggerpunkte, Konsens und Konflikt in der Gegenwartsgesellschaft” describes how contemporary societies are experiencing profound divisions and increasing polarisation in their civic discourse and subsequent protest culture (Mau, Lux, & Westheuser, 2023). The authors contend that conflicts are disagreements that are unique to individuals and stem from more profound divergences rooted in varied social locations and worldviews. This complexity is characteristic of contemporary social conflicts, marked by several social, economic and ideological strata. The authors examine how new forms of cultural class struggles are arising, which differ from traditional economic conflicts. The current divergences between people are fuelled by educational disparities, access to cultural knowledge and learned ideologies. These differences have led to significant divisions within society. The authors emphasise that understanding the social context of opinions is crucial in analysing contemporary inequality-related conflicts.

The authors introduce the concept of four specific "arenas" of inequality in which social conflicts are fought out. These arenas are metaphorical places of public struggle, where loyalties are formed and deepened and no fixed rules or referees exist. The arenas group individual social conflicts into larger units, which enables them to be analysed more effectively (pp. 37-38).

In the Top-Bottom arena, inequality in terms of economic and social resources and social hierarchy is highlighted. The gap between rich and poor, access to power and social mobility are vital topics. Survey results show that the majority of respondents perceive growing income and wealth inequality as problematic and call for government redistribution measures. Focus group discussions reveal the emotional depth of these views, with frustration and anger expressed at the visible poverty and wealth (pp. 70-75).

The social and political dynamics of migration and national borders are discussed in the inside-outside arena. These discussions reflect deep questions of national identity and a sense of security. The dynamic between the need to control migration and the desire for a more open policy is characterised by an increasing polarisation of opinions, with social media acting as catalysts for the spread of support and rejection of migrants (pp. 118-135).

The Us-Them Arena focuses on the social perception and treatment of group identities, with conflicts of recognition and debates about norms of tolerance taking centre stage. Social media also plays a central role here, providing platforms for visibility and self-advocacy for marginalised groups, as well as contributing to the spread of discrimination and hate (pp. 158-163).

Finally, the Today-Tomorrow Arena addresses the discrepancy in climate and environmental policy. Different social groups, such as the yellow waistcoats and the Fridays for Future movement, represent the divided perception of and commitment to climate protection. This arena highlights the need to consider climate policy's immediate and long-term social and environmental impacts. It emphasises the importance of a fair distribution of the burdens and benefits of ecological change (pp. 205-220).

The authors describe the conduct of group discussions in various German cities. These discussions were conducted to capture various opinions and perceptions regarding social inequality conflicts. Participants from different social classes and political and ideological backgrounds were included to reflect the diversity of the views within society (pp. 54-55). Participants were asked to identify the most pressing and controversial issues facing Germany in the discussions. The results showed that most of the matters spontaneously mentioned by the participants fell into three of the four inequality arenas: Rents, prices, income and education (Top-Bottom Arena); immigration and refugees (Inside-Outside Arena); climate change, energy and transport transition (Today-Tomorrow Arena). In all discussion groups, at least one problem was also mentioned that can be assigned to the "Us-Them" Arena, which indicates a broad perception of conflicts over recognition and identity politics (pp. 55-56).

The analysis of the group discussions showed that the spontaneously mentioned topics confirm the relevance of the proposed arena typology. The wide variety of topics mentioned illustrates how diverse the conflicts in German society are and how deeply they are embedded in the social fabric. It is emphasised that the participants perceive these conflicts as profound and complex, which underlines the need for a differentiated view and treatment of social inequality conflicts. The authors conclude the group discussions that indicate that the social and political landscape in Germany is characterised by a multitude of overlapping and interacting inequality conflicts. These conflicts express not only material inequalities but also deeply rooted social and cultural tensions further exacerbated by current political and economic developments (pp. 56-58).

In the study "Classification of Poverty Condition Using Natural Language Processing" (Muñetón-Santa, Escobar-Grisales, López-Pabón, Pérez-Toro, & Orozco-Arroyave, 2022), the authors use NLP methods to categorise people as "poor" and "extremely poor". Form 367 interviews

conducted in Medellín Machine-generated document-level features were then analysed using various classification methods such as Support Vector Machines, Random Forest and Extreme Gradient Boosting. (pp. 1414-1415) The study found that data complexity was a challenge and publicly available texts and social media may not accurately represent those living in poverty (pp. 1420-1421). The study emphasises the potential of NLP to reveal insights into social conditions like poverty, which expands the tools for social policy (pp. 1422-1424).

The study "Digital Streets of Rage" by Teija Sederholm et al. (2023) investigates how extremist messages spread during Finland's Independence Day. The authors use NLP methods to identify and classify extremist content on Twitter and Telegram in a small language space. They draw on the concept of the rhizome, which describes a network-like and non-hierarchical information flow system, to explain the complex and unstructured spread of information during such events (Sederholm, Jääskeläinen, Lonka, & Huhtinen, 2023, pp. 403-405). By analysing an extremism media index that categorises news from "moderate" to "extreme", they reveal that extremist news is in the minority but quite present and identifiable through the developed NLP methods (pp. 404-407).

Identifying extremist messages is challenging due to the networked and non-hierarchical (rhizomatic) nature of information exchange. The study emphasises that the boundaries between normal and extremist discourse are often blurred. (Sederholm, Jääskeläinen, Lonka, & Huhtinen, 2023, p. 408). These findings are crucial for understanding the role of digital platforms in spreading extremism and social discourse along protest movements and offer essential insights for future research approaches in this area.

2 Telegram as a Field of Research

Examining the role of Telegram as a research field for analysing social inequalities reveals a deep interconnection between digital communication platforms and social discourses. Thanks to its cloud-based infrastructure, the platform enables users to send and receive messages, photos, videos and other files via PCs, tablets and smartphones. Since its inception in 2013 by the Durov brothers - the creators of the Russian Facebook alternative VKontakte, Telegram has become synonymous with free speech. The messenger's monthly active users increased from 500 million in Jan 2021 to 800 million by Aug 2023. (Statista Research Department, 2024). Not least because of its high level of privacy and its policy of not sharing user data with governments, the platform surpassed 900 million followers in March 2024. (Murphy, 2014) Telegram's security features are attractive to users of all backgrounds, including political activists, extremists and marginalized groups who may lack representation in other media.

Telegram differs from other social media in its structure and functionality. It enables private communications and the creation of channels and groups, making it a powerful tool for information dissemination and mobilisation. The platform does away with algorithmic content amplification; posts appear chronologically, encouraging unbiased and direct communication. These aspects contribute to Telegram being used both for the spread of disinformation and for the organisation of social movements, making the platform a dual field of research in terms of its use for social inequality and for political mobilisation and resistance (van Sickle, 2024).

Telegram allows users to have private chats and create group chats with up to 200,000 members. This functionality significantly increases the complexity of communication dynamics on the platform (Jost, et al., 2023, p. 214). Unlike groups, which are interactive communication spaces,

channel’s function more like broadcast media, where administrators can send content to an unlimited number of subscribers. These channels are often used to distribute news, updates and propaganda and provide a one-way form of communication that allows information to be disseminated quickly (Jost, et al., 2023, pp. 214-15).

The diverse forms of communication on Telegram not only increase the flexibility of user interactions but also the complexity of data analysis. Researchers face the challenge of extracting meaningful information from a wealth of unstructured data. Analysing this data requires advanced methodological approaches that can understand the dynamics and contextuality of the communications (pp. 2015-2017).

In addition, the ability to remain anonymous and disseminate information quickly influences how social movements and political groups use the platform. This has both positive and negative effects on social discourse, as it allows essential social and political issues to be addressed, but also encourages the spread of disinformation and extremist content (pp. 217-219).

Research shows that Telegram is central in expressing and discussing social inequalities. Due to Telegram's anonymity and security, users can speak openly about topics that might be censored or monitored in other forums. This allows for a broader and deeper discussion of social inequalities, bringing mainstream and underrepresented perspectives to light. Various studies have examined how Telegram forms counter-publics that challenge traditional media and promote alternative narratives on social inequalities (Wiedemann, Schmidt, Rau, Münch, & Kessling, 2023).

3 Methodology

For the empirical study of this master's thesis, data was collected using a specialised Telegram crawler developed for complexium GmbH. This tool specialises in extracting publicly accessible messages from Telegram channels and groups dealing with various aspects of social activism. The selection of channels and groups was initially based on publicly accessible channels and groups that engage in broad discourses on topics such as conspiracy theories, political alignments (right, left), environmental issues, cybersecurity and fundamentalism. This dataset was compiled by the political analysts of my practice partner, complexium GmbH. In addition, by analysing network effects, further relevant channels and groups were added to the data collection—these were automatically identified by references or responses within the community. The crawler uses a Docker-based architecture and modular configuration to efficiently utilise the Telegram API for authentication across multiple phone numbers and sessions, data collection, analysis and error handling. The process includes generating session files through the Telethon library and retrieving messages. Between 10/02/2024 and 16/04/2024, posts and comments from 10,514 groups and channels were retrieved this way. [1]

The data collected comprised three main types: channel posts, group posts and comments, which were stored in a structured SQL database. To comply with ethical guidelines, all personal information and metadata were removed so that only the text content and a unique ID assigned by the crawler were used for further analyses. These measures guarantee the anonymity of the data and prevent any conclusions from being drawn about the authors' identity. To maintain the ethical standards of social

[1] More detailed explanation of the crawler can be found in the Appendix.

science research, the study was conducted in accordance with the Hertie Schools data protection regulations and coordinated with the ethical research and legal departments.

The main analysis of the collected data is carried out by using a zero-shot NLI classifier. This type of classifier enables the categorisation of text data without prior training specifically for the existing dataset by using pre-trained models. For this analysis, the model `deberta-v3-large-zeroshot-v2.0` by Moritz Laurer was used, which is specifically designed for the efficient performance of classifications in a political context.

The classification is based on four hypotheses, each assigned to one of the "arenas" of social inequality, as Mau, Lux, and Westheuser described in their book. Hypotheses were formulated for each category, which served as the basis for classifying the texts. The classifier evaluates the extent to which a text fulfils the criteria of each hypothesis, using both single-label and multi-label approaches to reflect the complexity and multidimensionality of the discourses.

The classification results are then used to analyse and interpret the underlying patterns of the discourse. Particular attention will be paid to the distribution of topics across the four arenas and to the question of how specific social, economic and political contexts are reflected in the discourses. By analysing these aspects in detail, a deeper understanding of the mechanisms of social inequality and their representation in social media will be achieved. As expected, the results of this analysis will provide new insights into the structure and dynamics of this discourse and help to empirically apply the theoretical concepts of Steffen Mau et al. to the research field of Telegram and thus verify them.

4 Research Design

The book Triggerpunkte by Steffen Mau et al. provides the theoretical framework for categorising social discourse into four arenas of inequality. The authors understand these arenas, Top-Bottom, Inside-Outside, Us-Them and Today-Tomorrow, as metaphorical battlefields on which social conflicts over resources, recognition, identity and future prospects are articulated.

The main research question of this thesis is: Can the hypothesis that social discourses on social inequality issues can be categorised into four different arenas be confirmed by analysing the social media discourse on Telegram using a classifier? This leads to several sub-questions: Is it possible to categorise expressions of social discontent into one of the four predefined arenas, or are these expressions typically more intertwined? How does the discourse in the individual arenas manifest itself in terms of thematic consistency and differentiability?

It was agreed to anonymise the data before further processing to comply with ethical guidelines and requirements from the university's legal and research ethics department. For this purpose, all platform-side metadata was removed so that only the type of text (channel posts, group posts, comments) and the actual text content were used. For further identification of the texts in the analysis, an ID individually assigned by the crawler was used, which, however, has no reference to authors or other metadata. This measure ensures no conclusions about the author and their ideology can be drawn. The data collected is distributed as follows:

Channel contributions: 2,022,460 posts were collected, including 305,839 in German, 364,421 in English and 516,849 in Russian.

Group contributions: 1,973,052 contributions were collected, with 408,694 in German, 384,235 in English and 376,011 in Russian.

Comments: 20,875 comments were recorded, of which 10,375 were in German, 6,989 in English and 227 in Russian.

To process and analyze a large volume of data from Telegram posts for this thesis, an efficient method was implemented as part of the research design. Given the need to classify several hundred thousand posts, a language recognition library was used. Based on Google's speech recognition for Python[2], it determines the language of each post automatically and accurately. Efficient management of big data and limited computational resources is crucial. Despite large GPU capacities, classifying thousands of posts into multi and single-label hypotheses took several days.

The language recognition allowed filtering of the data before the content analysis. All posts containing only media types such as videos and photos and most posts with only a URL address, were filtered out to ensure that only text-based content was included in the analysis. The challenge of language diversity within the Telegram posts required additional considerations. Although using a multilingual classifier initially appeared to be a possible solution, this approach was insufficient due to a lack of reliability in accurate classification. The decision was therefore made to focus mainly on English-language contributions. To compare the results with those of the German-speaking area and thus present a more extensive data basis while ensuring the project's practical feasibility, German-language comments were translated into English.

However, this decision entails significant limitations. The theoretical concept of Steffen Mau et al. refers primarily to the dynamics within German society. It analyses specific social and economic phenomena within Germany and selectively places the observations from the surveys

[2] langdetect on PyPI (https://pypi.org/project/langdetect/)

in the context of other countries such as the USA. Thus, applying this theory to English language data requires a critical consideration of cultural and contextual differences and social divergences. The English language, unlike German, does not represent a homogenous socio-economic space. English is spoken in different cultural and social contexts worldwide, each with its own social structures and dynamics of inequality. Critical reflection on these limitations is crucial to interpret the study's results appropriately and recognise the opportunities for future research that could overcome these limitations.

A zero-shot classifier was used to categorise the Telegram posts that were collected. This classifier does not require any prior training on a specific dataset. Instead, based on the defined hypothesis statements, it uses pre-trained models to categorise posts into one of the four "arenas" of social inequality. This is done by utilising Natural Language Inference (NLI). Text classification with NLI models works by analysing the relationship between two pieces of text: a "context" and a "hypothesis". This allows previously trained NLI models to be applied to new tasks without the need for specific training data for each new task. For example, a statement about the economy can be translated into the NLI task by checking whether the context supports the hypothesis "The statement is about the economy" (Laurer, van Atteveldt, Casas, & Welbers, 2023, p. 11). The model has already developed an extensive linguistic and task-related knowledge base as part of its pre-processing. Compared to traditional methods, which require learning from scratch, NLI significantly reduces effort and the need for large amounts of data (pp. 12-14).

When using NLI models for text classification, both single-label and multi-label classification approaches can be implemented. These approaches utilise their ability to simultaneously translate each classification task into an inference task when evaluating multiple hypotheses. Multi-label and single-label classification offer different approaches to dealing with the probability that multiple hypotheses apply to a given context. These

differences are particularly relevant regarding the application to complex social discourse.

In multi-label classification, each hypothesis is evaluated independently of the others. Each Telegram post is analysed to determine if it supports the four hypotheses related to inequality arenas. Each hypothesis is treated as a separate task within the model. The model determines if the hypothesis is "true" or "false" based on the given context. This approach allows the data to be in-depth analysed, as each hypothesis is considered independently. The model can thus recognise which themes apply more than once and depict complex social phenomena that touch on several dimensions of inequality simultaneously.

In single-label classification, however, the model selects only one hypothesis most applicable to the given text, even if the text could support several hypotheses simultaneously. This is done by evaluating all the hypotheses and selecting the one with the highest probability from the total set of all hypotheses. Single-label classification analyses which hypothesis is most likely to dominate the overall context of the text. This approach helps identify the dominant perspective within a text but may overlook more nuanced contexts where multiple aspects of inequality are present simultaneously.

The wording for these hypotheses was derived from the surveys in the book. The hypotheses are:

Top-BottomInequalities: "Is this text discussing socio-economic disparities such as wealth or power distribution, income inequality, or class struggles? Does it focus on material resources, standard of living, or the tension between different economic classes, within society?"

I**nside-Outside Inequalities:** "Is this text discussing issues of national belonging, citizenship, immigration, or the distinctions between insiders

and outsiders of a society? Is it about integration policies, debates on national identity, or the challenges of open versus closed borders?"

Us-Them Inequalities: "Is this text centred on identity-based discrimination or struggles for recognition, particularly involving characteristics like gender, race, or ethnicity? Does it address issues of social recognition and the challenges faced by specific groups based on nationality, gender, or racial identity?"

Today-Tomorrow Inequalities: "Is this text focused on ecological sustainability, climate change and the impact of current decisions on future generations? Does it discuss the temporal aspects of inequality in relation to socio-economic decision making, environmental policies, climate actions and their long-term effects?"

For the classification, the deberta-v3-large-zeroshot-v2.0 model by Moritz Laurer was used (Laurer, van Atteveldt, Casas, & Welbers, Building Efficient Universal Classifiers with Natural Language Inference, 2024). This classifier is particularly suitable for analysing discourses on social inequality in Telegram posts without the need for complex fine-tuning, which would exceed the scope of this master's thesis. It will not be able to identify all posts correctly. However, this is not necessary, as the large number of posts means that we can subsequently focus on those posts with a high probability of being attributed to a sense of injustice, with several hundred thousand posts, this is still sufficient to carry out an analysis. Finally, the zero-shot classification capability makes learning directly from large and heterogeneous data sets without prior knowledge possible, which is crucial for dynamic social media platforms such as Telegram.

Among other things, the classifier is trained on texts from social media, including political topics, using various training data. This ensures that the model can recognise a wide range of contexts and language

nuances, which is crucial for understanding subtle and complex discourses on social inequalities. The flexibility of deberta-v3-large-zeroshot-v2.0 is further enhanced by the use of Natural Language Inference (NLI), which allows any classification task to be transformed into an entailment decision (Laurer, van Atteveldt, Casas, & Welbers, 2024, p. 2).

Therefore, the deberta-v3-large-zeroshot-v2.0 provides an effective solution to the challenges of text classification in the context of social inequality on Telegram through its advanced transfer learning capabilities and efficient use of pre-trained language and task knowledge (Laurer, van Atteveldt, Casas, & Welbers, 2023, pp. 4-5). For the limited scope of a master thesis, this made it feasible to conduct timely and relevant analyses on comparably large amounts of data without relying on extensive manual annotation.

A total of 329,868 Telegram posts were classified using both multi-label and single-label classification methods. This extensive classification allowed for an in-depth analysis of the social discourses conducted in the Telegram posts and provided valuable insights into the different dimensions of social inequalities represented by the theoretically defined arenas.

5 Data Analysis and Results

To analyse the classification results of the Telegram posts and comments, the study examined the number of texts classified into four different arenas of inequality using multi-label and single-label classification systems at different classification confidence thresholds. Next, with respect to the structure of the social media platform, the posts were split into group posts, channel posts and comments and then compared. The distributed classification results show apparent differences in the number of posts assigned to each arena. For example,

the multi-label classification at a threshold of 0.5 shows that 66,738 posts (20.23% of all classified posts) were assigned to the "Top-Bottom" arena.[3] In the same classification, 11,700 posts (3.55%) were assigned to the "Inside-Outside" arena, which at first glance indicates less discussion of these topics.

Classification Thresholds for all Telegram Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	4,013 (1.22%)	215 (0.07%)	1 (0.00%)	-	1,936 (0.59%)	-	-	-
0,90	14,700 (4.46%)	671 (0.20%)	9 (0.00%)	-	5,913 (1.79%)	-	-	-
0,80	35,511 (10.77%)	1,909 (0.58%)	93 (0.03%)	-	14,480 (4.39%)	-	-	-
0,70	48,578 (14.73%)	5,166 (1.57%)	230 (0.07%)	2 (0.00%)	30,030 (9.10%)	-	-	-
0,60	57,814 (17.53%)	8,290 (2.51%)	368 (0.11%)	56 (0.02%)	71,298 (21.61%)	-	-	-
0,50	66,738 (20.23%)	11,700 (3.55%)	596 (0.18%)	63 (0.02%)	120,453 (36.52%)	-	-	-
0,40	76,252 (23.12%)	15,595 (4.73%)	1,293 (0.39%)	76 (0.02%)	186,857 (56.65%)	1,901 (0.58%)	-	-
0,30	88,245 (26.75%)	21,022 (6.37%)	3,760 (1.14%)	88 (0.03%)	301,955 (91.54%)	40,401 (12.25%)	10 (0.00%)	-

In the single-label classification, it is noticeable that many posts - 120,453, or 36.52% of all classified posts - were assigned to the "Top-Bottom" arena with a threshold value of 0.5. This indicates that topics on socio-economic disparities are, according to the classifier, more dominant in the discourse than other topic areas. The Single-label categorisation shows which inequality arena is considered most salient, which is essential to identify the main concerns within the discourse. In contrast, multi-label classification enables an analysis that shows how different inequality arenas can be connected. For example, posts addressing socio-economic and environmental inequalities may indicate interdependent social issues.

[3] All tables can be found in the Appendix.(5.1 Classification Thresholds)

To analyse the differences in the classification results between group posts, channel posts and comments on Telegram in more detail, we can examine various aspects: the quantitative differences in classification frequency, the thematic orientation of the posts and the interaction dynamics. This analysis helps to develop a deeper understanding of how the discourse on social inequality manifests itself in different communication contexts on Telegram.

Classification Thresholds for all Group-Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	1,459 (1.15%)	102 (0.08%)	-	-	772 (0.61%)	-	-	-
0,90	5,945 (4.70%)	286 (0.23%)	3 (0.00%)	-	1,929 (1.52%)	-	-	-
0,80	16,084 (12.71%)	802 (0.63%)	68 (0.05%)	-	4,659 (3.68%)	-	-	-
0,70	21,631 (17.10%)	2,002 (1.58%)	94 (0.07%)	1 (0.00%)	11,276 (8.91%)	-	-	-
0,60	25,630 (20.26%)	3,487 (2.76%)	191 (0.15%)	53 (0.04%)	32,780 (25.91%)	-	-	-
0,50	29,445 (23.28%)	5,117 (4.05%)	316 (0.25%)	55 (0.04%)	53,006 (41.90%)	-	-	-
0,40	33,733 (26.67%)	7,022 (5.55%)	742 (0.59%)	64 (0.05%)	76,921 (60.81%)	662 (0.52%)	-	-
0,30	38,920 (30.77%)	9,644 (7.62%)	1,598 (1.26%)	69 (0.05%)	117,578 (92.95%)	13,136 (10.38%)	3 (0.00%)	-

According to the Classifier, group posts tend to have a higher engagement rate, reflected in the broader spread of topics across the four arenas. This could indicate that a more diverse discussion occurs in groups, where different aspects of social inequality are more often addressed simultaneously. The percentages in the multi-label categories are consistently higher than in the single-label categories, emphasising the multi-layered nature of group discussions. Group posts tend to have broad discussions encompassing multiple aspects of inequality. This is reflected in the higher frequency and diversity of multi-label classifications. At a probability threshold of 0.95, 1,459 posts (1.15%) were classified as Top-Bottom and 772 posts (0.61%) as single-label. This indicates that the topics often overlap, and a clear assignment to a single arena is rare. At a lower threshold of 0.3, the number of multi-label classifications increases to 38,920 posts (30.77%) for Top-Bottom and

117,578 posts (92.95%) for single-label. This shows that with less stringent criteria, more posts are considered relevant for the arenas.

Classification Thresholds for all Chanel-Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	2,011 (1.08%)	68 (0.04%)	1 (0.00%)	-	916 (0.49%)	-	-	-
0,90	7,614 (4.09%)	284 (0.15%)	6 (0.00%)	-	3,304 (1.78%)	-	-	-
0,80	17,009 (9.14%)	888 (0.48%)	24 (0.01%)	-	8,229 (4.42%)	-	-	-
0,70	23,598 (12.69%)	2,801 (1.51%)	129 (0.07%)	1 (0.00%)	15,695 (8.44%)	-	-	-
0,60	28,087 (15.10%)	4,305 (2.31%)	163 (0.09%)	3 (0.00%)	32,751 (17.61%)	-	-	-
0,50	32,549 (17.50%)	5,943 (3.20%)	252 (0.14%)	8 (0.00%)	58,415 (31.41%)	-	-	-
0,40	37,048 (19.92%)	7,737 (4.16%)	503 (0.27%)	11 (0.01%)	97,209 (52.26%)	1,034 (0.56%)	-	-
0,30	42,984 (23.11%)	10,249 (5.51%)	2,063 (1.11%)	18 (0.01%)	167,608 (90.11%)	24,887 (13.38%)	6 (0.00%)	-

Channel posts show less diversity in the multi-label categories compared to group posts, which could indicate that channels often have more specific and targeted content focussing on dominant topics. This is confirmed by the higher percentages in the single-label categories, suggesting that channel operators may have a clear thematic line. Channel posts are often more targeted with a stronger focus on individual topics, making them ideal candidates for single-label categorisation. Channels usually serve as a broadcast medium where the channel operator sets the issues and less interactive discussion occurs. Therefore, it is almost surprising that the difference in diversity to group posts is so low. Channel posts often disseminate content on specific topics or agendas, showing a slight bias towards more dominant single topics. At a threshold of 0.95, 2,011 posts (1.08%) were classified in the Top-Bottom Arena, while 916 posts (0.49%) were classified as single-label. The figures are comparatively lower than for group posts, which indicates a narrower topic focus.

Comments are more concentrated on specific topics, as the high values in the single-label classifications show. This could be because comments are often direct responses to posts or questions within a channel or group

and, therefore, have less thematic breadth. Comments are usually in response to specific aspects of a previous post and tend to focus on single, clearly defined topics. Furthermore, on average, they are significantly shorter than the sometimes very long groups and, above all, cannel posts.

Classification Thresholds for all Comments

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	543 (3.13%)	45 (0.26%)	-	-	248 (1.43%)	-	-	-
0,90	1,141 (6.57%)	101 (0.58%)	-	-	680 (3.92%)	-	-	-
0,80	2,418 (13.92%)	219 (1.26%)	1 (0.01%)	-	1,592 (9.17%)	-	-	-
0,70	3,349 (19.28%)	363 (2.09%)	7 (0.04%)	-	3,059 (17.61%)	-	-	-
0,60	4,097 (23.59%)	498 (2.87%)	14 (0.08%)	-	5,767 (33.20%)	-	-	-
0,50	4,744 (27.31%)	640 (3.68%)	28 (0.16%)	-	9,032 (52.00%)	-	-	-
0,40	5,471 (31.50%)	836 (4.81%)	48 (0.28%)	1 (0.01%)	12,727 (73.28%)	205 (1.18%)	-	-
0,30	6,341 (36.51%)	1,129 (6.50%)	99 (0.57%)	1 (0.01%)	16,769 (96.55%)	2,378 (13.69%)	1 (0.01%)	-

In the next step, the classified posts were filtered to validate the accuracy of the classification methodology and gain further insights into the structures of discourse dynamics in the context of social inequality on Telegram. Steffen Mau et al. categorised their collected statements from the surveys and group discussions into different arenas using unpublished keyword lists. Based on this approach, keyword lists were used to filter and analyse the 329,868 previously classified Telegram posts using Database queries. The aim is to evaluate the classification methodology's effectiveness and test the suitability of the selected categories for describing social discourse.

Specific keyword lists were created for each of the four inequality arenas to analyse the Telegram posts.[4] These lists were used to identify words likely to fall into these categories. Posts that matched multiple keyword

[4] The Lists and the corresponding tables are in the Appendix. (5.2 Keyword Analysis Tables)

lists were assigned to the respective arenas accordingly. This approach allows for precise classification and analysis of how well the keywords cover the intended discourse topics. The resulting tables show the number and percentage of posts that exceed certain classification thresholds in relation to the entire dataset and the respective keyword group. This provides important insights into which areas are strongly represented or may be better classified.

A total of 98,564 posts that contained at least one relevant keyword were identified and included in this analysis. Similar to the previous study of the posts classified by the NLI zero shot classifier, most posts (61,173) were classified in the Top-Bottom Arena. With 20,022 posts, the inside-outside arena shows a moderate presence in the data set. This is also consistent with the earlier results and validates the classifier. The two arenas, Us-Them and Today-Tomorrow, were the least represented classes in the keyword analysis, with 8,947 and 8,415 posts for Today-Tomorrow. This is congruent with the previous for the Us-Them Arena. However, posts and comments on climate, energy, and intergenerational relationships, on the other hand, were the smallest group in the manual data set. Still, they were found in even lower quantities by the NLI classifier.

Along the four keyword lists, a total of 11834 posts were assigned to two categories, 1994 posts were assigned to three categories, and 207 posts contained words from all four categories, reflecting the complexity and interconnectedness of the topics within the social discourse on Telegram. On average, almost 50% of classified posts were identified by the multi-label classification at a threshold of over 30%, despite only capturing just over a quarter of all posts through the keyword analysis. This underlines the effectiveness of the multi-label classifier, particularly in recognising posts that deal with complex or overlapping topics. The Top-Bottom category is conspicuous here, with a significantly higher identification rate by the classifier, which indicates that socio-economic topics occur more

frequently in the discussions in quantitative terms and are also recognised disproportionately by the classifier. This could be due to a more substantial presence and possibly also to a bias of the classifier towards this category. It may be necessary to use a different, more concise hypothesis for further analysis.

In contrast, the analysis of climate-related posts (Today-Tomorrow) shows that these reach around 50 posts in all keyword lists with a threshold value of 60%, except in the Us-Them category. This number closely mirrors the rate shown by the classifier, indicating a strong match between the pre-sorting based on keywords and the automatic classification in this specific topic. Interestingly, the data indicates a different distribution of thresholds per keyword group compared to the distribution of multiple mentions in the manually categorised posts. This suggests that specific topics such as environment and climate (Today-Tomorrow) and identity and recognition issues (Us-Them) may have fewer overlapping keywords, which could explain the lower overlap rates in these categories.

Using keyword filtering, 6,298 messages were classified as multi-labelled for the 'Top-Bottom' category at a threshold value of 50%, corresponding to 10.29% of the filtered posts in this category. In comparison, 66,738 posts (20.23%) were categorised as 'Top-Bottom' in the entire data set. The high proportion of classifications in both the filtered and unscreened data indicates that this topic tends to be overrepresented by the classifier. The keyword filtering confirms that a high number of posts actually contain relevant topics in this category, which indicates a potentially correct but possibly overestimated frequency of 'Top-Bottom' classification by the classifier.

For 'Inside-Outside', the analysis shows that at a 50% threshold, 1,322 of the filtered posts were classified, representing 6.60% of the filtered posts, compared to 11,700 posts (3.55%) in the entire dataset. This could

indicate that the classifier achieves an adequate representation for 'Inside-Outside', with keyword filtering showing a good match with the posts identified by the classifier. For 'Us-Them', it shows that 245 filtered posts (2.74%) were classified at a 50% threshold, compared to 596 posts (0.18%) in the entire dataset. The higher percentages in the filtered data indicate an underrepresentation of this category in the whole dataset, meaning that the classifier may not be effective enough to identify relevant discussions in this category, even though the keyword filtering recognises a significant number of relevant posts. Finally, for 'Today-Tomorrow', at a threshold of 50%, 53 of the filtered posts were classified, representing 0.63%, compared to 63 posts (0.02%) in the entire dataset. Again, the category appears to be underrepresented in the entire dataset, while the filtering shows that there are relevant posts that the classifier may miss.

6 Discussion

The results of the data analysis provide revealing insights into the structure and dynamics of social inequality as reflected in the discourses on Telegram. In the analysis, most posts were prescribed around socio-economic inequalities. However, when applying the multi-label class bias, high levels of class division were also represented in the inside-outside arena, showing that national identity and ethnocentric tensions are significant discourse themes. However, this bias along the four arenas is only marginally attributable to the classifier and the chosen hypothesis but rather a symptom of the discourse on Telegram.

A closer look at the wording in the individual classified Telegram posts reveals an extreme accumulation of right-wing populist and extreme right-wing ideology. Much more so than initially assumed. The analysis reveals a complex mixture of socio-economic, ethnocentric discourses accompanied by a significant deviation from the theoretical framework.

Steffen Mau et al. argued that the arenas are relatively independent. The study suggests that these arenas are strongly interwoven in practice and form a syndrome that can only be broken down into thematic pillars on closer inspection.

A consistent theme in many posts is the depiction of crisis-ridden socio-economic developments on a global and local level, linked to nationalist-nativist ideologies that invoke a 'homogeneous people'. The rhetoric divides society into "us" - who are portrayed as honest, good and above all as victims - and "the others", who are characterised as criminal, deceitful and lying perpetrators. This dichotomy is reflected in economic concerns such as lost jobs, rising prices, reduced pensions, a damaged economy, and high spending on social welfare, which are often blamed on the "others". The collective we of these contributions is thus losers of the Top-Bottom Arena.

The antagonists in these posts can be classified into the original four arenas upon analysis of their descriptions. "Those up there" the fictional elite or "those down there" the long-term unemployed and welfare recipients seen as parasites, "those out there" the outsiders or foreigners, "the individuals who want to impose their reality of life" LGBTQ, gender language, climate activism. This categorisation, which is deeply rooted in Telegram discourses, shows how the theoretically separate arenas of Mau et al. merge in practice. The Top-Bottom Arena dominates, as the analysis of the classification of the quotes shows. This perpetrator-victim division means that we can very well represent the four proposed arenas in the description of the "others", but this is overshadowed in the discourse primarily conducted on Telegram by the fact that it is transferred from the imagined victims to a socio-economic power, class, and money gap. as a result, the Top-Bottom Arena so clearly predominates in the discourse conducted on Telegram that it is not possible to group the mostly right-wing populist contributions singularly into one of the proposed arenas. Instead, they must be considered within

an overall socio-economic framework and can then be sub-differentiated within this.

The subsequent in-depth examination of some specific posts reinforces the complex interweaving of inequality arenas, which Steffen Mau et al. present as separable in their theoretical considerations but which merge strongly in the reality of the Telegram discourse.

For example, the German translated post: "If I want to protect and preserve my homeland, my culture, in today's world, I am labelled a fascist and racist. But if I want to destroy Germany and its culture, then I am considered an activist and even funded by taxpayer money." The classification values reflect a high relevance in the Top-Bottom (0.990943789482117) and Inside-Outside (0.974873304367065) arenas, while the values for Us-Them and Today-Tomorrow are negligible. This post clearly illustrates how economic and cultural fears converge and invoke a defence of the 'in-group' (the "us") against the perceived threat of 'out-groups' (the "others"), blending the discourses of the Top-Bottom and Inside-Outside Arenas.

Another example is the post about an elderly British couple: "An elderly British couple were informed by a council letter trying to 'force' them to sell home to house illegal immigrants. This is what replacement looks like." This text also achieved high classification values in the Top-Bottom (0.963285267353058) and Inside-Outside (0.957169413566589) arenas, which indicates an overlap between economic threat and xenophobic rhetoric. The post alludes to the fear of displacement by 'the others' and uses economic arguments to motivate resistance to immigration.

The third example is a supposed comment about climate change: "Black individuals are experiencing climate change differently from others, they should stay at home and don't live of our honestly earned money" is

uttered. The classification values in the Top-Bottom (0.978899717330933) and Today-Tomorrow (0.3528028660453856) arenas should be emphasised here. This post combines racial slurs with an economically driven debate on climate change.

These examples show how the discourses conducted on Telegram merge the four arenas originally proposed by Mau et al. and combine to form a syndrome far more than the sum of its parts. The Top-Bottom Arena predominates throughout, as it often serves as the primary filter for interpreting social and economic issues, revealing a strong focus on economic inequality and power relations.

7 Conclusion

The analysis and discussion have shown that the four arenas of social inequality proposed by Steffen Mau et al. - Top-Bottom, Inside-Outside, Us-Them, and Today-Tomorrow - do not operate quite as independently and are not as compartmentalised in the real world, particularly on Telegram, as theorised. The results of this research suggest that the boundaries between these arenas are permeable, and the discourses are strongly interwoven, revealing a complex syndrome of inequality that cannot be easily divided into single, independent categories.

The data analysis has made it clear that the classification results often show high scores in several arenas simultaneously, indicating the multidimensionality and overlapping nature of the themes. In particular, the dominance of the Top-Bottom Arena emphasises that socio-economic issues such as income inequality, power distribution and social status are central to most discourses. These findings challenge the theoretical assumption that the arenas operate largely independently of each other, and they emphasise the need to examine the dynamics and interactions between different forms of inequality more closely.

In conclusion, this thesis offers valuable insights into the complexity of social inequality discourses on Telegram and provides an empirical basis for further research. It highlights the need to rethink and further develop theoretical models of social inequality in order to better understand and address the real-world interconnections and dynamics between different dimensions of inequality. Research has shown that social media is a vibrant field that is rich in data for understanding social processes, but also presents methodological challenges that need to be overcome. It is an important task to develop the tools and theoretical frameworks further to uncover and analyse the multi-layered and often hidden mechanisms of social inequality expressed in digital discourses.

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Appendix

1. Detailed description of the inequality arenas in Mau, Lux, & Westheuser

1.1. Top-Bottom Inequalities

The book defines the Top-Bottom Arena as a social arena of conflict over the distribution of economic and social resources and the position of different groups and classes within the social hierarchy. This arena is concerned with the struggle between rich and poor, access to power and the mechanisms of social mobility, which are influenced by economic and political structures (Mau, Lux, & Westheuser, 2023, p. 70). The survey results (questionnaire in the appendix) in this arena, therefore, show that a large proportion of the population sees growing income and wealth inequality as problematic and favours greater state intervention in redistribution. Around 80% of respondents agree that the differences are too significant, and around 70% would like the state to take action to reduce them (p. 71).

The emotional depth of these views becomes even more evident in the focus group debates. Participants express frustration and anger at their neighbourhoods' visible poverty and wealth. The discussions illustrate how deeply rooted the perception of injustice is and how strong the desire for a fairer society is. At the same time, an inevitable resignation or powerlessness is revealed regarding the possibilities of bringing about change (pp. 71-72). The text suggests that social and economic inequalities are a central, albeit complex, issue in modern society. The 'Top-Bottom Arena' remains an area of intense debate and disagreement, raising profound questions about justice, merit, and the role of the state in the distribution of resources. The findings from surveys and focus groups highlight awareness and concern about these issues

but also highlight the challenges associated with mobilising for change (pp. 74-75).

The study of socio-economic inequalities and societal responses to them includes a detailed examination of occupational classes and how they contribute to inequalities in income and social position through their different market situations and working conditions (pp. 75-85). It is shown that the distribution of resources and control over labour processes strongly depend on occupational positions and the availability of capital. A central aspect of the discussion is the influence of meritocratic belief as a conception of justice, which is seen as an important factor in justifying inequalities in society (pp. 85-95). Here, the tension between the expectation that achievement determines individual outcomes, and the reality of structurally unequal opportunities is highlighted. The authors show how these contradictions can lead to conflict, especially when the population questions the legitimacy of the meritocratic system.

It is emphasised that social media provide a platform for typified images and ideas of different recipient groups of social support to be created and disseminated. These representations significantly influence public opinion and debates about the justification and merit of social support (p. 92). The public perception of social groups is, therefore, strongly influenced by the dissemination of simplified and often polarising representations in social media. The text emphasises the role of social media as a place where social realities are constructed and negotiated, which in turn has an impact on political and social responses to inequality.

1.2. Us-Them Inequalities

The book describes the inside-outside arena by discussing the social and political dynamics of migration and national borders. This arena is a conceptual framework that deals with the social and political boundaries between citizens and non-citizens inside and outside a state. These

dynamics influence national identity, perceptions of security and a sense of belonging (Mau, Lux, & Westheuser, 2023, pp. 118-119). The survey results show an increasing polarisation of opinions on migration, with some citizens supporting more openness, while others increasingly support restrictive measures (p. 123). Focus group debates reveal that discussions about migration are often highly emotional and characterised by personal experiences and perceptions (pp. 134-135).

According to the book, the discourse on migration is intense both in the traditional media and social networks. Social media plays an increasingly important role in this arena by providing platforms for disseminating information and opinions that contribute to the spread of both support and opposition to migrants (p. 132). Interaction on social media often amplifies opinion formation, allowing like-minded communities to form and information to spread quickly, but this can also contribute to the spread of disinformation and polarising content.

Discussions and actions in the inside-outside arena reflect profound national identity, security, and inclusion/exclusion issues. Debates are often characterised by a dichotomy between the need to control migration and the desire for a more open, inclusive policy. These dynamics show how complex and emotional the issues of migration and national borders are, which have profound implications in both public discourses and private discussions (pp. 134-135).

While some interviewed for this book favour greater openness, others increasingly support restrictive measures. This is reflected in the attitudinal profiles, which show a mixture of a conditional willingness to include and a marked interest in closure. This suggests that most of the population recognises the economic necessity and cultural benefits of immigration. Still, there are considerable reservations regarding the number and origin of immigrants and the competitive relationship between natives and immigrants (pp. 136-152).

1.3. Inside-Outside Inequalities

The "Us-Them Arena" centres on societal perceptions and treatment of group identities. The arena is characterised in the book by struggles for recognition and conflicts about what is considered "normal" or "deviant" (Mau, Lux, & Westheuser, 2023, p. 158). The discourse in this arena is strongly characterised by social media, which serve as platforms for visibility and recognition, as well as conflicts and misunderstandings. On the one hand, social media promotes the visibility of minorities and supports campaigns for equal rights. Still, on the other hand, it also contributes to the spread of discrimination and hatred (pp. 162-163).

A central issue in this discourse is how norms of tolerance and recognition should be implemented in society. While legal progress has made great strides towards equality, discussions and surveys show that there are still many challenges in everyday life. For example, the public display of homosexuality is perceived by some as a challenge to traditional norms, which puts a strain on social acceptance (p. 170). The surveys and focus group discussions described in the book showed that subtle discrimination and recognition conflicts still exist despite a trend towards liberalisation and a broader acceptance of diversity. Focus groups often emphasise how people make an effort to show their tolerance, while at the same time, there is still discomfort and a lack of understanding towards certain groups (pp. 160-161).

Social media plays a dual role in this arena. On the one hand, they enable marginalised groups to find a platform for visibility and self-advocacy. On the other hand, they can also contribute to the spread of hate speech and disinformation, further deepening existing social divisions. The analysis highlights how digital communication influences the dynamics between different social groups and often intensifies conflicts (p. 183). The discussion emphasises that the social debate about "Us-Them" inequalities is complex and often contradictory. There is a tension

between the desire for integration and equality on the one hand and the continued reality of unequal treatment and discrimination on the other. The discourse is characterised by an ongoing struggle for the right balance between the recognition of difference and the need for an everyday social basis (p. 199).

1.4. Today-Tomorrow Inequalities

The arena of "Today-Tomorrow inequalities" in the book describes the discrepancies in climate and environmental policy and their future impact, both within societies and globally. The analysis emphasises different movements' contrasting interests and social profiles by comparing the Yellow Waistcoat movement in France and the Fridays for Future movement. The "Today-Tomorrow arena" is characterised as a social space in which conflicts regarding the speed and form of the ecological transformation of society are fought out. These disputes encompass a variety of ecological and climate issues that are closely linked to social inequalities, such as the varying degrees to which different social groups are affected and their capacity to deal with the consequences of climate change (Mau, Lux, & Westheuser, 2023, pp. 205-209).

The surveys and focus group debates clarify that the perception of and commitment to climate protection depend heavily on social and economic factors. The discrepancy between the positions of the yellow waistcoats, who are mainly recruited from the poorer classes and are protesting environmentally motivated tax increases, and the predominantly younger, better-educated participants in the Fridays for Future movement, who are calling for global climate protection measures, illustrates the social divisions within the ecological debate (pp. 210-213). The discussions and conflicts in this arena reflect the need to consider both climate policy's immediate and long-term environmental and social impacts. It is emphasised that a fair distribution of the burdens and

benefits of ecological transformation is central to the acceptance and effectiveness of climate protection measures (pp. 217-220).

2. Original wording of the survey from Mau, Lux, & Westheuser

Wortlaut der Survey-Items (kursivierte Items wurden in den Einstellungsindex der jeweiligen Arena einbezogen) (Mau, Lux, & Westheuser, 2023, pp. 524-526)

Oben-Unten-Ungleichheiten

- *Die Einkommens- und Vermögensunterschiede in Deutschland sind zu groß.*
- In unserer heutigen Gesellschaft gibt es nicht genügend Respekt für einfache Menschen, die ehrlich und hart arbeiten.
- Jeder ist seines Glückes Schmied. Ob man im Leben etwas erreicht, hängt vor allem davon ab, wie sehr man sich anstrengt.
- *Die Hartz-IV-Sätze sollten deutlich erhöht werden.*
- Langzeitarbeitslose, die Hartz-IV bekommen, sollten dazu verpflichtet werden, gemeinnützige Arbeit zu leisten.
- Armut ist in erster Linie eine Frage der Motivation und Leistungsbereitschaft und lässt sich nicht allein mit Geld bekämpfen.
- *Der Staat sollte Maßnahmen ergreifen, um Einkommensunterschiede mehr als bislang zu verringern.*
- *Eine Erhöhung der Erbschaftssteuer für große Erbschaften ist sinnvoll, um die sozialen Ungleichheiten in Deutschland zu verringern.*

- *Wenn die staatlichen Mittel knapp sind, dann ist es wichtiger, viel ins Bildungssystem zu investieren statt in die Unterstützung von Arbeitslosen.*

Innen-Außen-Ungleichheiten

- *Heutzutage gibt es in Deutschland zu viele Migranten.*
- Nur Migranten, die sich anstrengen und integrieren, sollten die gleichen Rechte bekommen wie Einheimische.
- Wenn heutzutage behauptet wird, dass Migranten häufig Straftaten begehen, dann steckt dahinter oft Ausländerfeindlichkeit.
- *Es ist gut für die deutsche Wirtschaft, wenn Migranten hierherkommen.*
- *Es ist bereichernd für das kulturelle Leben in Deutschland, wenn Migranten hierherkommen.*
- *Den Einheimischen kommt zu wenig zu Gute, weil zu viel für Migranten ausgegeben wird.*
- *Durch die vielen Migranten hier fühle ich mich manchmal wie ein Fremder im eigenen Land.*
- *Bei der Aufnahme von Fluchtlinien aus dem arabischen und afrikanischen Raum sollte es eine Obergrenze geben.*
- *Bei der Aufnahme von Flüchtlingen aus der Ukraine sollte es eine Obergrenze geben.*

Wie-Sie-Ungleichheiten

- *Homosexuelle werden heutzutage in Deutschland immer noch diskriminiert und benachteiligt.*

- *Es ist gut, dass Ehen zwischen zwei Frauen bzw. zwischen zwei Männern erlaubt sind.*
- *Schwule und lesbische Paare sollten die gleichen Rechte haben, Kinder zu adoptieren, wie Paare, die aus Mann und Frau bestehen.*
- *Um Vorurteile gegenüber Homosexuellen abzubauen, sollten in Schulmaterialien wie z.B. Büchern, Filmen oder Aufgaben auch homosexuelle Personen vorkommen.*
- *Personen, die ihr Geschlecht geändert haben, sollten als normal anerkannt werden.*
- *In Deutschland übertreiben es viele mit ihrer Toleranz gegenüber Lesben, Schwulen und Transgender-Personen.*
- *Eine gendergerechte Sprache, bei der alle Geschlechter eingeschlossen sind, ist ein wichtiger Beitrag für die Gleichstellung.*
- *Es sollte Geschlechterquoten bei Stellenbesetzungen geben, selbst wenn das bedeutet, dass Männer manchmal das Nachsehen haben.*
- *Die aktuellen Sexismus-Diskussionen, bei denen das Verhalten von Männern gegenüber Frauen kritisiert wird, finde ich übertrieben.*
- *Menschen mit schwarzer Hautfarbe werden in Deutschland heutzutage in vielen Lebensbereichen diskriminiert.*
- *Das Thema Rassismus nimmt in den Medien zu viel Raum ein.*

- *Manche meinen, man müsse Straßen umbenennen, weil ihre Namen etwas mit Rassismus zu tun haben. Das halte ich für übertrieben.*

Heute-Morgen-Ungleichheiten

- *Ich bin sehr besorgt über den Klimawandel.*
- *Die ständige Forderung, umweltbewusst zu leben, empfinde ich als Zumutung.*
- *Für den Klimaschutz sollten deutlich mehr Windräder aufgestellt werden, selbst wenn das in der Nähe von Ortschaften geschehen muss.*
- *Mit zunehmendem technologischem Fortschritt werden wir auch den Klimawandel bewältigen, ohne dass wir unser Leben groß ändern müssen.*
- *Wir riskieren unseren gesamten wirtschaftlichen Wohlstand, wenn wir jetzt wegen des Klimawandels alles auf den Prüfstand stellen.*
- *Deutschland hat schon viel für den Klimaschutz getan. Bevor wir jetzt weiter unser Leben umstellen, sollten erst mal andere Lander nachziehen.*
- *Es wäre nur gerecht, wenn die, die viel haben, am meisten zur Bewältigung der Klimakrise beitragen müssten.*
- *Eine umweltschonende Lebensweise wird vor allem von jenen Leuten gefordert, die sich die teuren Bio-Produkte auch leisten können. Auf einfache Leute wird dabei zu wenig geachtet.*

3. Survey from the book Mau, Lux, & Westheuser translated.

Wording of the survey items (italicised items were included in the attitude index of the respective arena) (Mau, Lux, & Westheuser, 2023, pp. 524-526)

Top-Bottom Inequalities:

- *The income and wealth disparities in Germany are too large.*
- In our society today, there is not enough respect for ordinary people who work honestly and hard.
- Everyone is the architect of their own fortune. Whether one achieves something in life depends mainly on how much effort they put in.
- *The Hartz IV rates should be significantly increased.*
- Long-term unemployed receiving Hartz IV should be obliged to perform community service.
- Poverty is primarily a question of motivation and willingness to perform and cannot be combated with money alone.
- *The state should take measures to reduce income disparities more than before.*
- *An increase in the inheritance tax for large inheritances makes sense to reduce social inequalities in Germany.*
- *When state funds are scarce, it is more important to invest heavily in the education system rather than in support for the unemployed.*

Inside-Outside Inequalities

- *Nowadays, there are too many migrants in Germany.*
- Only migrants who make an effort and integrate should have the same rights as natives.
- Claims that migrants frequently commit crimes are often rooted in xenophobia.
- *It is good for the German economy when migrants come here.*
- *It enriches the cultural life in Germany when migrants come here.*
- *The natives benefit too little because too much is spent on migrants.*
- *With so many migrants here, I sometimes feel like a stranger in my own country.*
- *There should be a cap on the admission of refugees from the Arab and African regions.*
- *There should be a cap on the admission of refugees from Ukraine.*

Us-Them Inequalities

- *Homosexuals are still discriminated against and disadvantaged in Germany today.*
- *It is good that marriages between two women or two men are allowed.*
- *Gay and lesbian couples should have the same rights to adopt children as couples consisting of a man and a woman.*

- *To reduce prejudices against homosexuals, educational materials such as books, films, or tasks should also include homosexual individuals.*
- *People who have changed their gender should be recognised as normal.*
- *Many in Germany overdo their tolerance towards lesbians, gays, and transgender individuals.*
- *Gender-inclusive language, which includes all genders, is an important contribution to equality.*
- *There should be gender quotas in job placements, even if it means that men sometimes lose out.*
- *I find the current discussions on sexism, in which men's behaviour towards women is criticised, to be exaggerated.*
- *People with black skin are discriminated against in many areas of life in Germany today.*
- *The issue of racism takes up too much space in the media.*
- *Some think that streets should be renamed because their names are associated with racism. I find this exaggerated.*

Today-Tomorrow Inequalities

- *I am very concerned about climate change.*
- *The constant demand to live sustainably is a burden.*
- *Significantly more wind turbines should be erected, even if this must happen near towns.*

- *With increasing technological progress, we will also be able to manage climate change without having to change our lives significantly.*
- *We risk our entire economic prosperity if we now scrutinize everything because of climate change.*
- *Germany has already done a lot for climate protection. Before we change our lives further, other countries should catch up.*
- *It would only be fair if those who have a lot contribute the most to tackling the climate crisis.*
- *A sustainable lifestyle is mainly demanded by those who can afford the expensive organic products. Not enough attention is paid to ordinary people.*

4. The Telegram Crawler

For the Data Collection, we used a telegram crawler developed for my practice partner, complexium GmbH. Therefore, the crawler itself is not part of this master thesis. It was implemented to extract messages from publicly open Telegram channels and groups systematically. Utilising a Docker-based architecture and a modular configuration approach, this crawler capitalises on the Telegram API to facilitate data acquisition for analytics and monitoring purposes. Its operation involves several key components: session management, message fetching, error handling, and data integration, all orchestrated within a Docker environment for enhanced scalability and security.

The crawler's operation begins with session management, pivotal for authenticating and maintaining a session with the Telegram API. Each Telegram account the crawler uses requires a unique session file, which is generated through the telethon library by providing credentials such as the phone number, API ID, and API hash. These session files are crucial

as they store the authentication tokens necessary for the crawler to interact with Telegram's servers. Each message retrieved is then processed to determine its type (group post or channel post) and stored in respective lists for group posts and channel posts.

Upon retrieval, messages are processed and stored in an SQL database, enabling structured data analysis and retrieval. The database interaction is configured through environment variables that specify the database credentials and connection details, ensuring that the crawler can dynamically connect to various databases based on deployment needs. Functions within the crawler handle the transformation and storage of data, ensuring that messages are appropriately parsed and categorised into groups or channels.

5. Tables

5.1 Classification Thresholds

The tables show the number of Telegram posts classified into the four different arenas of inequality (Top-Bottom, Inside-Outside, Us-Them, Today-Tomorrow) using both multi-label and single-label classification systems at different thresholds of classification confidence. Each row represents a threshold of classification confidence (e.g., 0.95, 0.90, down to 0.30), showing how many posts were classified at or above each probability level for each arena. Further they display how these results differ across the different types of posts (group, channel, comments).

Classification Thresholds for all Telegram Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	4,013 (1.22%)	215 (0.07%)	1 (0.00%)	-	1,936 (0.59%)	-	-	-
0,90	14,700 (4.46%)	671 (0.20%)	9 (0.00%)	-	5,913 (1.79%)	-	-	-
0,80	35,511 (10.77%)	1,909 (0.58%)	93 (0.03%)	-	14,480 (4.39%)	-	-	-
0,70	48,578 (14.73%)	5,166 (1.57%)	230 (0.07%)	2 (0.00%)	30,030 (9.10%)	-	-	-
0,60	57,814 (17.53%)	8,290 (2.51%)	368 (0.11%)	56 (0.02%)	71,298 (21.61%)	-	-	-
0,50	66,738 (20.23%)	11,700 (3.55%)	596 (0.18%)	63 (0.02%)	120,453 (36.52%)	-	-	-
0,40	76,252 (23.12%)	15,595 (4.73%)	1,293 (0.39%)	76 (0.02%)	186,857 (56.65%)	1,901 (0.58%)	-	-
0,30	88,245 (26.75%)	21,022 (6.37%)	3,760 (1.14%)	88 (0.03%)	301,955 (91.54%)	40,401 (12.25%)	10 (0.00%)	-

Classification Thresholds for Group-Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	1,459 (1.15%)	102 (0.08%)	-	-	772 (0.61%)	-	-	-
0,90	5,945 (4.70%)	286 (0.23%)	3 (0.00%)	-	1,929 (1.52%)	-	-	-
0,80	16,084 (12.71%)	802 (0.63%)	68 (0.05%)	-	4,659 (3.68%)	-	-	-
0,70	21,631 (17.10%)	2,002 (1.58%)	94 (0.07%)	1 (0.00%)	11,276 (8.91%)	-	-	-
0,60	25,630 (20.26%)	3,487 (2.76%)	191 (0.15%)	53 (0.04%)	32,780 (25.91%)	-	-	-
0,50	29,445 (23.28%)	5,117 (4.05%)	316 (0.25%)	55 (0.04%)	53,006 (41.90%)	-	-	-
0,40	33,733 (26.67%)	7,022 (5.55%)	742 (0.59%)	64 (0.05%)	76,921 (60.81%)	662 (0.52%)	-	-
0,30	38,920 (30.77%)	9,644 (7.62%)	1,598 (1.26%)	69 (0.05%)	117,578 (92.95%)	13,136 (10.38%)	3 (0.00%)	-

Classification Thresholds for Channel-Posts

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	2,011 (1.08%)	68 (0.04%)	1 (0.00%)	-	916 (0.49%)	-	-	-
0,90	7,614 (4.09%)	284 (0.15%)	6 (0.00%)	-	3,304 (1.78%)	-	-	-
0,80	17,009 (9.14%)	888 (0.48%)	24 (0.01%)	-	8,229 (4.42%)	-	-	-
0,70	23,598 (12.69%)	2,801 (1.51%)	129 (0.07%)	1 (0.00%)	15,695 (8.44%)	-	-	-
0,60	28,087 (15.10%)	4,305 (2.31%)	163 (0.09%)	3 (0.00%)	32,751 (17.61%)	-	-	-
0,50	32,549 (17.50%)	5,943 (3.20%)	252 (0.14%)	8 (0.00%)	58,415 (31.41%)	-	-	-
0,40	37,048 (19.92%)	7,737 (4.16%)	503 (0.27%)	11 (0.01%)	97,209 (52.26%)	1,034 (0.56%)	-	-
0,30	42,984 (23.11%)	10,249 (5.51%)	2,063 (1.11%)	18 (0.01%)	167,608 (90.11%)	24,887 (13.38%)	6 (0.00%)	-

Classification Thresholds for Comments

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	543 (3.13%)	45 (0.26%)	-	-	248 (1.43%)	-	-	-
0,90	1,141 (6.57%)	101 (0.58%)	-	-	680 (3.92%)	-	-	-
0,80	2,418 (13.92%)	219 (1.26%)	1 (0.01%)	-	1,592 (9.17%)	-	-	-
0,70	3,349 (19.28%)	363 (2.09%)	7 (0.04%)	-	3,059 (17.61%)	-	-	-
0,60	4,097 (23.59%)	498 (2.87%)	14 (0.08%)	-	5,767 (33.20%)	-	-	-
0,50	4,744 (27.31%)	640 (3.68%)	28 (0.16%)	-	9,032 (52.00%)	-	-	-
0,40	5,471 (31.50%)	836 (4.81%)	48 (0.28%)	1 (0.01%)	12,727 (73.28%)	205 (1.18%)	-	-
0,30	6,341 (36.51%)	1,129 (6.50%)	99 (0.57%)	1 (0.01%)	16,769 (96.55%)	2,378 (13.69%)	5 (0.01%)	-

5.2 Keyword Analysis Tables

The keyword analysis tables were created using a refined subset of data, specifically filtered to include entries containing certain keywords related to the four Arenas. For each keyword group, a separate table was generated. Each table detailed the number of entries surpassing each threshold within the specified categories, presented both as raw counts and as percentages. These percentages were calculated in two forms. The total dataset proportion represents the percentage of entries in the filtered set, relative to the entire dataset, that exceed the specific thresholds, while the group-specific proportion indicates the percentage of entries within the same keyword group that surpass the thresholds, offering insights into the characteristics and classification sensitivity of texts related to specific themes.

Top-Bottom: elite, power, wealth, rent, lease, work, price, inflation, pension, retire, annuity, poor, oppressed, income, salary, class, disparity, distribution, standard of living, econom, privil, inequality, affluent, marginalized, status, stasi, poverty, rich, capitalism, socialism, bourgeois, proletariat, homeless, welfare, corrupt, exploit, redistrib

Inside-Outside: foreign, national, immigrant, citizen, outsider, migrant, border, integration, refug, asylum, cultur, identity, replace, diaspora, muslim, jew, islam, exile, alien, headscarf, minority, reset, resettlement,

Us-Them: gender, race, racism, racial, queer, feminism, ethni, discrimination, identity, minor, equal, prejudice, stereotype, diversity, inclusion, sexism, homo, xeno, LGB, indigenous, bias, political correctness, language police, semitism, solidar, intersec

Today-Tomorrow: future, fff, fridaysforfuture, thunberg, last generation, clima, sustain, generation, environ, ecolog, carbon, footprint, warming, greenhouse, renewable, energy, conservation, pollut, deforest, biodivers, emissions

Classification Thresholds for 'Top-Bottom' Keywords

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	620 (0.19%, 1.01%)	35 (0.01%, 0.06%)	-	-	439 (0.13%, 0.72%)	-	-	-
0,90	1,487 (0.45%, 2.43%)	80 (0.02%, 0.13%)	2 (0.00%, 0.00%)	-	1,422 (0.43%, 2.32%)	-	-	-
0,80	3,184 (0.97%, 5.20%)	252 (0.08%, 0.41%)	61 (0.02%, 0.10%)	-	3,046 (0.92%, 4.98%)	-	-	-
0,70	4,445 (1.35%, 7.27%)	402 (0.12%, 0.66%)	69 (0.02%, 0.11%)	2 (0.00%, 0.00%)	5,020 (1.52%, 8.21%)	-	-	-
0,60	5,414 (1.64%, 8.85%)	539 (0.16%, 0.88%)	80 (0.02%, 0.13%)	54 (0.02%, 0.09%)	11,426 (3.46%, 18.68%)	-	-	-
0,50	6,298 (1.91%, 10.29%)	704 (0.21%, 1.15%)	87 (0.03%, 0.14%)	57 (0.02%, 0.09%)	17,239 (5.23%, 28.18%)	-	-	-
0,40	7,415 (2.25%, 12.12%)	919 (0.28%, 1.50%)	106 (0.03%, 0.17%)	58 (0.02%, 0.09%)	28,559 (8.66%, 46.68%)	238 (0.07%, 0.39%)	-	-
0,30	8,874 (2.69%, 14.51%)	1,251 (0.38%, 2.04%)	160 (0.05%, 0.26%)	58 (0.02%, 0.09%)	54,772 (16.60%, 89.53%)	7,540 (2.29%, 12.33%)	2 (0.00%, 0.00%)	-

Classification Thresholds for 'Inside-Outside' Keywords

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	880 (0.27%, 4.39%)	66 (0.02%, 0.33%)	-	-	802 (0.24%, 4.00%)	-	-	-
0,90	2,481 (0.75%, 12.39%)	224 (0.07%, 1.12%)	-	-	1,917 (0.58%, 9.57%)	-	-	-
0,80	4,176 (1.27%, 20.85%)	605 (0.18%, 3.02%)	58 (0.02%, 0.29%)	-	3,669 (1.11%, 18.32%)	-	-	-
0,70	5,078 (1.54%, 25.36%)	904 (0.27%, 4.51%)	64 (0.02%, 0.32%)	-	5,045 (1.53%, 25.19%)	-	-	-
0,60	5,603 (1.70%, 27.98%)	1,099 (0.33%, 5.49%)	68 (0.02%, 0.34%)	52 (0.02%, 0.26%)	6,728 (2.04%, 33.60%)	-	-	-
0,50	5,965 (1.81%, 29.79%)	1,322 (0.40%, 6.60%)	82 (0.02%, 0.41%)	52 (0.02%, 0.26%)	9,061 (2.75%, 45.25%)	-	-	-
0,40	6,303 (1.91%, 31.48%)	1,572 (0.48%, 7.85%)	89 (0.03%, 0.44%)	52 (0.02%, 0.26%)	12,796 (3.88%, 63.90%)	584 (0.18%, 2.92%)	-	-
0,30	6,721 (2.04%, 33.56%)	1,869 (0.57%, 9.33%)	103 (0.03%, 0.51%)	52 (0.02%, 0.26%)	18,861 (5.72%, 94.19%)	4,130 (1.25%, 20.62%)	1 (0.00%, 0.00%)	-

Classification Thresholds for 'Us-Them' Keywords

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	552 (0.17%, 6.17%)	21 (0.01%, 0.23%)	-	-	322 (0.10%, 3.60%)	-	-	-
0,90	1,132 (0.34%, 12.65%)	49 (0.01%, 0.55%)	-	-	997 (0.30%, 11.14%)	-	-	-
0,80	1,763 (0.53%, 19.70%)	106 (0.03%, 1.18%)	-	-	1,890 (0.57%, 21.12%)	-	-	-
0,70	2,077 (0.63%, 23.21%)	149 (0.05%, 1.67%)	1 (0.00%, 0.01%)	-	2,442 (0.74%, 27.29%)	-	-	-
0,60	2,285 (0.69%, 25.54%)	199 (0.06%, 2.22%)	1 (0.00%, 0.01%)	1 (0.00%, 0.01%)	2,976 (0.90%, 33.26%)	-	-	-
0,50	2,401 (0.73%, 26.83%)	245 (0.07%, 2.74%)	7 (0.00%, 0.08%)	1 (0.00%, 0.01%)	3,795 (1.15%, 42.41%)	-	-	-
0,40	2,524 (0.77%, 28.21%)	305 (0.09%, 3.41%)	11 (0.00%, 0.12%)	1 (0.00%, 0.01%)	5,054 (1.53%, 56.48%)	108 (0.03%, 1.21%)	-	-
0,30	2,688 (0.81%, 30.04%)	402 (0.12%, 4.49%)	18 (0.01%, 0.20%)	1 (0.00%, 0.01%)	8,455 (2.56%, 94.49%)	1,169 (0.35%, 13.06%)	-	-

Classification Thresholds for 'Today-Tomorrow' Keywords

	Multi Top-Bottom	Multi Inside-Outside	Multi Us-Them	Multi Today-Tomorrow	Single Top-Bottom	Single Inside-Outside	Single Us-Them	Single Today-Tomorrow
0,95	66 (0.02%, 0.78%)	2 (0.00%, 0.02%)	-	-	35 (0.01%, 0.42%)	-	-	-
0,90	119 (0.04%, 1.41%)	6 (0.00%, 0.07%)	1 (0.00%, 0.01%)	-	192 (0.06%, 2.28%)	-	-	-
0,80	298 (0.09%, 3.54%)	73 (0.02%, 0.87%)	52 (0.02%, 0.62%)	-	716 (0.22%, 8.51%)	-	-	-
0,70	424 (0.13%, 5.04%)	88 (0.03%, 1.05%)	53 (0.02%, 0.63%)	1 (0.00%, 0.01%)	1,277 (0.39%, 15.18%)	-	-	-
0,60	585 (0.18%, 6.95%)	98 (0.03%, 1.16%)	53 (0.02%, 0.63%)	53 (0.02%, 0.63%)	1,881 (0.57%, 22.35%)	-	-	-
0,50	768 (0.23%, 9.13%)	118 (0.04%, 1.40%)	54 (0.02%, 0.64%)	53 (0.02%, 0.63%)	2,818 (0.85%, 33.49%)	-	-	-
0,40	975 (0.30%, 11.59%)	146 (0.04%, 1.73%)	57 (0.02%, 0.68%)	53 (0.02%, 0.63%)	4,428 (1.34%, 52.62%)	34 (0.01%, 0.40%)	-	-
0,30	1,221 (0.37%, 14.51%)	198 (0.06%, 2.35%)	58 (0.02%, 0.69%)	53 (0.02%, 0.63%)	7,700 (2.33%, 91.50%)	1,028 (0.31%, 12.22%)	1 (0.00%, 0.01%)	-

6. Statement of Authorship

I hereby confirm and certify that this master thesis is my own work. All ideas and language of others are acknowledged in the text. All references and verbatim extracts are properly quoted and all other sources of information are specifically and clearly designated. I confirm that the digital copy of the master thesis that I submitted on 13. May 2024 is identical to the printed version I submitted to the Examination Office on 14. May 2024.

DATE: Berlin, 13. May 2024

NAME: Justus v. Samson-Himmelstjerna

SIGNATURE: