

MASTER'S THESIS

Investigation of the Interactions in the Cycling Policy Process : The Case of Pop-up Bike Lanes in Germany

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Abstract

Due to the outbreak of COVID-19, pop-up bike lanes have been implemented in several cities in Germany to provide safe traveling. It is considered as policy change which offers an opportunity to observe the policy process. The frameworks for this research are multi-streams policy cycle framework as it explains how different policy entrepreneurs corresponded to different streams, and how they interact within a stream in the policy process of cycling. Critical discourse analysis and topic modeling were utilized to investigate elements in the framework because language has been the main tool for the communication of mankind. The findings were the four discursive advocacy coalitions embedded within the political stream, discourses of some political parties were reproduced on newspaper, and different ideologies are not a guarantee to the success of policy or policy change. Although the ideologies were not directly discovered, some discourse practices can reflect them.

Keywords: Cycling Policy Process, Multi-Streams Policy Cycle Framework, Topic Modeling

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Introduction

1 Introduction

Cycling has long been promoted as carbon neutrality and a health-beneficial mode of transport. It gives great benefits to people and society. Although the health concern enhances the visibility and value of cycling [1], it has not been a dominant mode of transport around the world. However, a different cycling policy is implemented due to the outbreak of COVID-19 [2]. Pop-up bike lanes¹ have been widely implemented in several cities in Germany as it ensures social distancing and provides safety in traveling [3]. The newly installed infrastructure has turned road space into a cycling path.

While in the perspective of users, factors influencing the use of cycling and its infrastructure have been heavily studied in several aspects [4] [5] [6], the actors and policy process which govern or restrain the policy lack of advancements [7] [8]. Inevitably, governance and politics are integral parts of transportation, especially at the public policy level. Marsden and Reardon [8] studied the governance in transportation and noticed that transportation policy in the past decade has been focusing on tools for decision-making that contribute to knowledge for transportation policy making, rather than knowledge of policy in transportation. Less engaging with real-world examples and policymakers reflects a distance between the study of policymaking and the complexities of reality [8].

Policy entrepreneurs, or actors in the policy process, can be studied through a different lens. [9]. Weber [7] [10] studied the cycling policy process using the Multiple Streams Framework (MSF) and emphasized that policy entrepreneurs play substantial roles in the policy process, yet they have not been much investigated. Advocacy Coalition Framework (ACF) [11] is another theoretical framework that emphasizes the competition of coalitions. A coalition is a group of policy entrepreneurs which is glued together by the same policy core belief. They compete by promoting their belief, and it results in policy changes. Coalitions can be determined by their discourse or language used [12] [13].

Language is closely linked to ideologies since language usage is the most common communicative activity [14]. They contribute to the formation of coalitions. [12] [15]. Understanding language can vary by interpretation of an individual, however, the statistical method is decisive and repeatable. Natural Language Processing (NLP) is a part of machine learning focusing on text data.

As policy entrepreneurs can belong to any coalitions or involve in different coalitions to different degrees [11], topic modeling is proposed. Topic modeling is one of the NLPs and its primary assumption of the algorithm is that words occurring together belong to the same topic, regardless of the tone. One document contains several topics to a different level of probability,

¹ Temporäre Radwege or Pop-up-Radwege in German

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and one topic contains words to a different level. It is a clustering problem that discovers topics in a given corpus as it observes all the documents with prior beliefs and updates the posterior beliefs using Bayesian Inference.

This research aims to investigate the interaction in the policy process of the pop-up bike lanes through the lens of the Multi-Streams Policy Cycle Framework using Critical Discourse Analysis and machine learning method, namely, topic modeling.

1.1 Research Questions

The questions of ideologies in cycling policy entrepreneurs are raised.

- What are the ideologies in cycling policy?
- By whom and how are they being produced and reproduced?
- How are they related in the policy process?

1.2 Objectives

Thus, the objectives of the research are as listed.

- To identify ideologies or potential policy core beliefs in the cycling policy process
- To analyze the interaction within and between different actors in the cycling policy subsystem
- To implement the statistical method to transportation policy process study

1.3 Scope of Work

The research mainly focuses on three cities in Germany including Berlin, Bremen, and Stuttgart. The data collected are political statements of parties, newspapers, and administrative officers' interviews.

2 Literature Review

Several aspects should be covered including cycling during the COVID-19 pandemic, cycling policy process, discourse in transportation, media discourse, intertextuality, and topic modeling in social studies.

The pop-up bike lanes have been emerged in several urban areas due to the COVID-19 pandemic. Nevertheless, the studies of them are still limited. Kraus and Koch [16] found evidence that people cycling more in European cities after the implementation of pop-up bike lanes. The recent infrastructure increased urban cycling by 7% in the first three months, or one kilometer of infrastructure increases the cycling by 0.6%. The monetary value of health benefits was calculated accordingly. The total amount of health benefits in the first three months is \$850. If the cycling habit level and the infrastructure stay still, it could rise to \$2.3 billion per year [16].

Measurements during COVID-19 in cycling or active modes were studied for future policy recommendations by Nikitas et. Al [2]. They examined the success and failure of different measurements around the world such as pop-up bike lanes, traffic calming, and e-bike subsidies. Overall, the usage rates and acceptance of cycling increased. Pop-up bike lanes were one of the best approaches suggested in the study.

Marsden and Reardon [8] suggested that studying governance and transport policy should utilize the Multiple Stream Framework (MSF) or Advocacy Coalitions Framework (ACF) to explain policy change from different angles. Weber [7] conducted the cycling policy process through the lens of MSF and suggested that the framework is suitable for non-motorized modes as it considers non-economic and non-quantitative factors in the policy process. The potential elements of three streams in cycling policy were discussed. Although the research by Weber [7] emphasized that the policy process and policy entrepreneurs have not been much investigated, another study of Weber [10] about the influences of policy entrepreneurs and window of opportunities regarding bicycle infrastructure at the municipal level asserted that policy entrepreneurs play a substantial role in the visibility of cycling, while the window of opportunities is vital in cities that had never invested in cycling infrastructure before.

As for the recent pop-up bike lanes policy, Kruspe et. al [17] measured public sentiment at the beginning of the pandemic using a neural network with Twitter data to determine the public mood in European countries. The sentiment in Germany has a negative correlation with the Corona cases. The sentiment significantly dropped at the beginning of March, although the measurements were not enforced yet. Likewise, Giese [18] studied the telehealth policy due to the pandemic and suggested that the global mood was fear and panic. The national mood is one of the factors leading to changes in policy as a part of the political stream in MSF [19].

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ACF was not utilized much in transportation. Stich and Miller [20] studied freight transport policy and supported that the framework can explain policy change in the freight transport subsystem. However, several studies in environmental policy and politics used this framework [12] [21] [22].

Dynamics within coalitions have been a weak point of ACF [23] [24] because there is variation in policy core belief which creates dynamics within and between coalitions. Hysing and Olsson [12] asserted that the flexible coalition concept is necessary for ACF to integrate the dynamics within and between coalitions. Hager [13] suggested an argumentative approach called discursive coalition which is defined as “a coalition that shares a way of talking and thinking in environmental issues but includes members with widely differing social and cognitive commitment”. Likewise, Leifeld [9] has proposed the integration of discourse into ACF as a discursive layer that operationalizes the core component of ACF, belief systems.

Analysis of transportation policy through the lens of discourse analysis was done before by Jensen et. al [25]. They examined the context of the word “improvement” and “enhance” along with their variants in the transportation policy at the discursive practices dimension, whether it reinforces or restrains car-centered ideology in transportation planning. The ways that policymakers discuss improvement in two contexts are different and the discourse of their discussion reveals their car-centered ideology. They asserted that using “improvement” in the context of changes in infrastructures is an exercising of official power fostering private vehicles.

Besides, topic modeling is a tool to analyze the context of documents without decisive categories before an analysis like a classification problem. Dahal et. al [26] discovered the topics around climate change using Twitter data. They gathered data from Twitter using keywords like “climate change” and “carbon dioxide” to find the aspects that being talked about on social media. Several topics related to climate change are revealed such as transportation, international agreement, and politics. Extensively, the number of tweets per day in the topic of politics coincides with political events related to climate change.

Studying text can be done at a different level according to the Critical Discourse Analysis [27]. Fairclough [28] studied intertextuality on articles published in a British national paper named The Sun about drug trafficking recommendation from the official documents. The findings were that The Sun supported the official documents, and reproduced the discourse as if the recommendations were made by The Sun. They rephrased all the content into their own words by converting formal language into spoken language and written dialogue into conversational one. The intertextuality reveals that The Sun report imitates the official documents by converting the original text into their discourses.

Ideologies are inextricably related to the language since language usage is the most prevalent type of social behavior [14] and they play a part in forming coalitions [12] [15]; the discourse is embedded in a policy process. Studying in the language being used through the cycling policy

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process can give an insightful result in ideologies around the process, as well as their production and reproduction which imply their power.

The pop-up bike lanes policy offers an opportunity to study the policy cycle as a whole because of the short time between the outbreak and the policy implementation, and a disaster can lead to abrupt policy change [19] [29]. The interactions in the cycling policy process have not been much investigated in the past, especially how different policy entrepreneurs play a role in the policy process. They can be studied through their discourses [9] [12] [25]. Topic modeling is proposed here because a statistical method is decisive and repeatable. It can cluster similar documents together by the cooccurrence of words in a document.

3 Theoretical Framework

3.1 Multi-Streams Policy Cycle Framework

The multi-streams policy cycle framework was recently discussed in the research [30] [31] [32] [33] [34]. It integrates the concept of Multiple Streams Framework [19], Advocacy Coalitions Framework [35], and Policy Cycle by disaggregating the policy entrepreneurs of MSF in the policy subsystem into three distinct groups called subsets of the subsystem, integrating the competition among subsets like ACF, and extending it to the whole cycle like the policy cycle.

Policy entrepreneurs are defined in MSF as one undifferentiated group of actors [31] [29] while policy subsystem is defined in ACF as actors at any government levels that focus on a particular subject within a spatial area which divides up to four subsets, who compete to advocate their belief [36] [11]. The streams are after MSF as Kingdon [19] suggested that there are three independent streams, which are problem stream, political stream, and policy stream. Streams are shaped to some degree by the competing coalitions in a subset [31].

(Figure is removed due to copyright.)

Fig. 3.1 Five-thread Model of Policy Process²

MSF was suggested by Kingdon [19] and it explicitly focuses on agenda-setting. As seen in Fig. 3.1 at the end of the agenda-setting process, three streams are coupled together. It is a short time, called the window of opportunity which can be opened by the problem stream or political stream. For example, when a disaster occurs, or when the power shifts, respectively. The coupling process at the right timing can significantly increase the chance of an item being on the government's agenda.

The streams have been described by Kingdon [19] in the MSF. The problem stream contains several problems in society. They are floating around society but not yet recognized. On the other hand, the policy stream contains ideas, instruments, or proposals to solve different problems, but it has not been matched with the problem yet. These ideas are floating around, sharpened, combined, or even faded away. The political stream consists of several factors such as national mood, organized political forces, and the government itself [31].

Therefore, to enhance the understanding of the policy process, the disaggregation of policy entrepreneurs is then suggested with a combination of other conceptual frameworks, which are epistemic communities, institution constituencies, and advocacy coalitions. Each theory explains a subset of the subsystem which associates with one stream. They interact with each

² Proposed by Mukherjee et al. [32]

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other to a different degree throughout the policy-making process. It is possible to distinguish the subsets and their associated streams by their interactions when the policy process goes beyond the agenda-setting.

Epistemic communities are working towards the visibility of the problems, or they associate with the problem stream. The awareness of a policy problem binds them together. They play a crucial role in agenda-setting as they define the problem. The definition of problem navigates the direction of the following policy process. They also inform other actors about the situation. The results of their actions are not easily reversed.

There was a study in the environmental policy suggesting that this group of actors are scientists, academic experts, public sector officials, and other government officers. They are connected by the science of the environmental dilemma [37] [38].

Instrument constituencies work on the instrument and promote them as a tool or combination of tools to solve some problems. They contribute most to the policy stream as the stream is full of policy alternatives and instruments. Some specific policy instruments connect them. They are exclusively concerned with the articulation and promotion of policy solutions.

The research [39] suggested that the instrument constituencies are consisted of “academia, policy consulting, public policy and administration, business, and civil society”.

Epistemic communities and instrument constituencies are working closely in some policies. For example, in the field of national environmental policy, the epistemic community could exist around climate change and they would work with the instrument constituency who develops emissions trading as an instrument. They would also unite with an advocacy coalition that holds a similar belief [32].

Advocacy Coalitions are after the Advocacy Coalitions in ACF developed by Sabatier [29] [40]. They are thought of as a milieu that competes to promote their policy core belief. The policy core belief is the second level of belief which is not easy to change. It glues policy entrepreneurs into a coalition. This is the most active and public group which is a successor of the visible participants described by Kingdon. Visible participants are people who receive a lot of press and public attention. They are likely to affect the government’s agenda than other policy alternatives.

The president, notable members of Congress, the media, and election-related players such as political parties and campaigners are more widely visible actors in the political stream, while lobbyists and other behind-the-scene advisers and participants are less visible actors.

Sabatier [29] has proposed the belief systems as a three-tiered hierarchical structure including deep core beliefs, policy core beliefs, and secondary beliefs. Deep core beliefs are very general normative and ontological assumptions about mankind. They are often the product of

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childhood and do not change easily. Secondly, policy core beliefs are extensions of deep core beliefs that cover an entire policy subsystem. It is sufficient to operationalize two or three policy core beliefs to define advocacy coalitions. The coalitions are tied together by this degree of belief. Lastly, secondary beliefs have a relatively narrow scope of interest, but they need less evidence to be changed.

Throughout the process, the problem stream and the epistemic communities maintain a central position as most activities occurring around the framing or definition of an issue are. Meanwhile, policy stream and instrument constituencies undergo fluctuation as they are active in policy formulation and implementation, where the solution is a main concern of the stage. On the other hand, the political stream is more active in agenda-setting and decision-making as coalitions compete to get their preferred choice chosen subsequently.

Each confluence point of streams introduces new actors, strategies, and resources to the flow of policymaking activities, while the intersection of streams at the critical junctures between stages represents a “window” as Kingdon explained. It first occurs at the policy window when at the connection between the agenda-setting and policy formulation process. As a result, the convergence establishes a new stream called policy process, which serves as the core pathway for all streams to join thereafter.

As shown in Fig. 3.1, three individual streams join at the end of the agenda-setting process according to MSF. During policy formulation, the political stream splits from other streams because the actions of specific policy participants contribute to propose policy alternatives and deliberations. However, the political stream often acts here without entangling itself directly with other streams. The development of ideas continues until the end of this stage, where the actors connect the policy problem and the solutions, resulting in potential alternatives.

The policy alternatives, as a result of policy formulation, are a foundation of the decision-making process where the political stream converges the process and problem streams creating momentum towards a decision. The policy stream involves less in this stage.

Policy implementation comes after the decision has been made, where the policy stream returns to converge with the main streams of problem, process, and newly-created program streams. The political stream then again splits out as advocacy coalitions are working in the background. The program stream is composed of policy participants and stakeholders who are working to calibrate new instruments and incorporate them into the existing ones. It represents an energy stream, where actors' time commitment to a relationship between problems and instruments was encapsulated. After a while, outputs of the instrument are accumulated, and the political stream returns when an evaluation occurs.

ACF plays a role not only as advocacy coalitions that described how actors are associated within the political stream but also as a refinement of the framework [31]. It shapes streams to a different degree by the competition of coalitions or subsets in the subsystem. For instance,

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coalitions that pursue others' approval of their definitive concept of the policy problem define the problem stream to a large extent. This logic applies to other streams and stages as well.

3.2 Critical Discourse Analysis

Critical Discourse Analysis (CDA) [41] [42] is research of discourse as the way power is expressed through text and speech, especially in the social and political context. It has no specific methodology or a common theoretical framework. There are various approaches as there are different levels, languages, and dimensions that can be examined. In principle, all frameworks are closely related as CDA aims to connect discursive practices, social practices, and social structures [42].

General premises of CDA according to Fairclough [27], van Dijk [41], Hodge and Kress [43], and Wodak [44] are as follows:

1. A language is a form of social practice that represents the world.
2. Discourse in any language is a form of social practice which expresses and reinforces other forms of social practice such as power, dominance, prejudice, and resistance.
3. The dialectical interaction between texts and social subjects which are writers and readers gives texts their meaning.
4. Linguistic features and structures are intentionally chosen. However, the choices can be conscious or unconscious.
5. Discourse produces, exercises, and reproduces power dynamics.
6. Discourse is historical because texts develop meaning through their placement in certain social, cultural, and ideological contexts, as well as specific times and places.

Fairclough [45] [46] [47] has defined CDA as a trans-disciplinary research methodology as it is required to be integrated within other frameworks. It is different from other interdisciplinary researches as it emphasizes communicative interaction. The analytical framework by Fairclough has three levels including text, discourse practice, and sociocultural practice as depicted in Fig. 3.2. It is not necessary to utilize all levels at once, but only at any levels that are relevant to study a specific event. His framework emphasizes media discourses, and it has been the most utilized one over the past decade.

(Figure is removed due to copyright.)

Fig. 3.2 Critical Discourse Analysis³

Discourse practice is the relevant level for this research as it bridges the gap between society and text [27]. According to Fairclough [28] [47], discourse practice contains two elements, focusing on the process of how they are produced, consumed, or reproduced. It can be

³ Proposes by Fairclough [47]

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explained as intertextual analysis which emphasizes the borderline between text and discourse practice as it examines text from the standpoint of discourse practice, or evidence of discourse practice in the text. Thus, it is more interpretative than linguistic analysis.

Sheyholislami [48] reviewed that the intertextuality of a text lies in the linguistic features and the analysis is an interpretation of the difference in features. There are some aspects of media discourses that should be considered. One of them is the politics of media because media discourses can contribute to reproduction as domination, and sometimes it can turn the public opinion against the state [47].

3.3 Hypotheses

According to the theoretical frameworks, the policy entrepreneurs in the political stream, or advocacy coalitions, are politicians and newspapers who compete to promote their beliefs. Administrative officers can belong to both problem and policy streams. Thus, several hypotheses are formed.

Hypothesis 1: According to the ACF and multi-streams policy cycle framework, Advocacy Coalitions hold a different belief and compete in the political stream like ACF. If topic modeling is useful for dividing policy entrepreneurs in the political stream like ACF, there should be at most four coalitions.

Hypothesis 2: According to the intertextuality of critical discourse analysis, if a newspaper directly reproduces political statements, the topic model of the newspaper should be able to distinguish political statements. That reflects power in media, and it is a part of the political stream in the multi-streams policy cycle framework.

Hypothesis 3: According to the multi-streams policy cycle framework, if all the streams exist, the policy process is complete, meaning that the pop-up bike lanes are implemented.

4 Methodology

4.1 Data Collection

According to the Multi-Streams Policy Cycle Framework, the study focuses on political statements made by politicians, newspapers, and administrative officers. The data is collected from the outbreak of novel COVID-19 to the end of 2020.

Political statements were collected from the official websites of the political party using keywords. Similarly, newspapers were collected from their website using the same keywords as criteria. Interview transcripts were provided from DLR.

For this research, three different types of data were collected including political statements, newspapers, and interviews of administrative officers. Political statements were collected from the official websites of political parties in Germany using keywords. Similarly, newspapers were collected from their website using the same keywords as criteria. Interview transcripts were provided from DLR as a part of the project on transport administration during the Covid-19 pandemic.

4.1.1 Political Statements

Statements were collected from the official websites of the parties, the official website of a political faction⁴, and the personal website of the politicians. The websites of any areas at any level in the country were collected with the assumption that a political party holds the same ideology.

The criteria for collection are two sets of keywords. The first set contains terms related to the situation being investigated and the second keyword is a term referring to bike lanes. Any articles should contain at least one term in each set.

situation-related terms	bicycle path terms
temporär	Radweg
pop-up	Radfahrstreifen
Pop-up	bikelane
Pop-Up	Bikelane
pop up	Maßnahme
Pop up	Fahrradstraße
Popup	Radfahr

⁴ Fraktion in German

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situation-related terms	bicycle path terms
Pop Up	Radstreifen
Pandemie	Radinfrastruktur
CORONA	
Corona	

Tab. 4.1 Keywords for Data Collection

If an article matches the criteria, it is collected. A webpage⁵, containing one press release article from a politician or politician, is treated as one document. The total amount of documents from different parties in different states are shown in the Tab. 4.2 Overview of Political Statements Collected.

States	AfD	CDU	CSU	Die Linke	FDP	Grüne	SPD
Bayern			2	1		9	5
Berlin	5	7		1	1	4	3
Bremen						1	
Bundestag				3		2	
Hamburg	1			2		2	1
Hessen						1	
Niedersachsen	1					1	
Nordrhein-Westfalen		1		1		6	1
Rheinland-Pfalz						1	
Saarland						1	
Sachsen							2
Sachsen-Anhalt				1			
Schleswig-Holstein					1	1	
Thüringen						3	1
Total	7	8	2	9	2	32	13

Tab. 4.2 Overview of Political Statements Collected

The unequal number of political statements made by political parties about the pop-up bike lanes is noticeable. Grüne significantly talked about the pop-up bike lanes more than others.

⁵ See Appendix I: Political Statement Collected for date collected and links

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4.1.2 Newspaper

newspapers were collected from newspaper websites⁶ using the same criteria as the political statements. Newspapers were collected intensively in the three investigated cities, Leipzig, Munich, and Hamburg. The total amount of collected articles from different publishers in different cities are shown in the Tab. 4.3 Overview of Collected Newspapers.

Newspaper	Berlin	Bremen	National	Hamburg	Leipzig	Munich	Stuttgart
Abendzeitung						5	
Berliner-Zeitung	8						
Bietigheimer Zeitung							2
Bild	3			1		4	
Hamburg Press Achieve				2			
Leipziger Zeitung					15		
LVZ					5		
Morgenpost				1			
RND					1		
Stuttgarter- Zeitung			1				20
Süddeutsch Zeitung	1					2	1
Tagesspiegel	13						
TAZ	27			2	1	1	
Welt	3			2			
Weser-Kurier		8	7				
Total	55	8	8	8	22	12	23

Tab. 4.3 Overview of Collected Newspapers

The collected newspapers were more in Berlin because Berlin is the first city in the country that implemented the pop-up bike lanes. Several newspapers reported the implementation. Hamburg, Leipzig, and Munich were included for a more complete set of ideologies of the cycling policy.

⁶ See Appendix II: Newspapers Collected for date collected and links

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4.1.3 Interview of Administrative Officers

The list of interviewees according to city and position is shown in Tab. 4.4 Overview of Interview Participants. The interview transcripts were obtained from DLR.

Administrative officers in three cities; Berlin, Bremen, and Stuttgart, were interviewed specifically about the pop-up bike lanes. The questions are as listed⁷.

The transcript is separated by person and question. An answer to a question by a given person is treated as one document because it is oriented to the question and reflects the person's ideologies.

Location	Count
Berlin (at city/state level)	4
Bremen	3
Friedrichshain-Kreuzberg, Berlin	2
National	1
Pankow, Berlin	1
Schorndorf, Stuttgart	1
Steglitz-Zehlendorf, Berlin	2
Stuttgart	6
Tempelhof-Schöneberg, Berlin	2

Tab. 4.4 Overview of Interview Participants

4.2 Corpus Formulation

The four corpora are formed for three models according to the hypothesis.

According to hypothesis 1, a **corpus of political statements and newspapers** is formed for clustering as *Model 1: Political Statements and Newspaper*.

According to hypothesis 2, a **corpus of newspapers** is formed for training *Model 2: Newspaper*. The model is used to predict topics of a **corpus of political statements**.

According to hypothesis 3, a **corpus of interview transcripts of administrative officers** is formed into one corpus for clustering as *Model 3: Interview Transcript of Administrative Officers*.

⁷ See Appendix III: Interview Questions

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However, only a corpus of political statements and newspapers and a corpus of interview transcripts of administrative officers are formed at this point. Corpora of newspapers and political statements are separated from the corpus of political statements and newspapers in the further step.

4.3 Data pre-processing

The pre-processing steps are carried out in order as shown in Fig. 4.1 Pre-processing Steps. The Intersection tokens of Political Statements and Newspaper Determination is marked light blue as it only applies to the political statements and newspaper corpus, before formulating the two separated corpora of the intersected tokens for Model 2: Newspaper. The original corpus of political statements and newspapers is still carried on to the next step for Model 1: Political Statements and Newspaper. Other steps applied to all corpora.



Fig. 4.1 Pre-processing Steps

4.3.1 “Pop-up” Modification

“Pop-up” is spelled differently across the country and actors, as shown in Tab. 4.1 Keywords for Data Collection. Modifying “pop-up” is crucial, so the model can analyze it as the same word. It was done in the first step of pre-processing as words can be changed or removed throughout the process.

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4.3.2 Lemmatization and Part of Speech Tagging

Then, lemmatization changes words into the original form or infinitive, for example, *genommen* should be changed into *nehmen*⁸. It is recommended more than stemming for the German language because words can be transformed in several ways. Lemmatization takes the dictionary into account while stemming only removes some prefixes and suffixes, for example, *nehmen* has different forms depending on tense and subject, such as *nimmt*, *nahm*, and *genommen*. Stemming is not capable of changing these words into the infinitive form as *nehmen*, thus, they are treated as different words in the algorithm.

Words were lemmatized and tagged its part of speech. Only nouns and adjectives were taken. Others were filtered out.

4.3.3 Punctuation, Number, and Character Removal, Lower Casing, and Tokenization

After that, punctuation and numbers were removed, except for a hyphen in "pop-up", so the word will still be bound together in further steps. Although the capital letter of the first letter of words in German represents nouns, it does not matter in terms of meaning. Every word should be lower-casing to diminish the differences. Tokenization breaks a sentence into words by spaces in between, which from this point onwards will be called tokens. A token that contains less than three characters is removed.

4.3.4 Stop-words Removal

Stop words are words that are not meaningful in themselves, or relevant to the analysis, for example, helping verbs, prepositions, and conjunction. Tokens that passed through the filter of part-of-speech step but not relevant to the analysis are removed here. It is the last step as it allows picking out some tokens intentionally.

There are several packages of stop words in German such as spacy, and NLTK. The package "plain" from Marco Götze and Steffen Geyer⁹ is modified¹⁰ and implemented here as primary stop-words for all corpora. Although it contains part of speech that was taken out, this is an assurance that these words are not going to further steps. Keywords as listed in Tab. 4.1 Keywords for Data Collection and tokens related to location, politicians, and political parties, are removed. Thus, the model is not clustered by location or political parties, the underlying content that is being talked about among actors. The tokens that are removed at this step are listed¹¹.

⁸ Nehmen (German) means take in English.

⁹ Source and information: <https://solariz.de/de/downloads/6/german-enhanced-stopwords.htm>

¹⁰ See Appendix IV: Stop-words, Primary Stop-words

¹¹ See Appendix IV: Stop-words, Political Statements and Newspaper Corpus and Interview Transcript of Administrative Officers Corpus

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4.3.5 Bigram Binding and Removal

Lastly, bigrams are two tokens that are likely to occur together according to the documents. It does not necessarily mean that the grams should always be aggregated as it might be two unrelated words that happened to be nearby often. Thus, it was analyzed using the frequency filter as a criterion. The filter detects if two tokens appear together; the value is five which means that two tokens should appear together at least five times.

Then, the bigrams were eyeballed for only specific names including names, cities, and streets, and the bike lane combination according to the keywords in Tab. 4.1. They were merged into a token and removed because names do not give meaning in this case, and topics should not be dominated by names of people, parties, or cities to determine ideologies among coalitions. A coalition can contain different people or political parties. Keywords were removed because it is the main context of all tokens. Every document refers to the keywords. Bigrams depend on the corpus, and they are listed¹².

More than two tokens may be merged, called n-grams. For example, bigrams are ('bike', 'lane') and ('pop-up', 'bike'). When three tokens appear respectively, they will be merged.

4.3.6 Intersection tokens of Political Statements and Newspaper Determination

Because Model 2: Newspaper is used to predict the topics of political statements, only tokens that intersect between two corpora are considered. Therefore, topics are not dominated by tokens that do not exist in another corpus and the model can perform well on another corpus.

The political statements and newspaper corpus were duplicated. One remains the same; another was modified. As the model of newspapers is used to cluster the corpus of political statements, only tokens that appear in both political statements and newspaper documents would be in consideration. Thus, the tokens that will not occur in both corpora after the separation were filtered out.

4.3.7 Dictionary Generation

All the tokens are defined as whether they are considered into a model by their occurrence. The minimum and maximum documents that a token occurs were defined to filter out the extreme tokens. Then, a dictionary of a corpus was generated to identify an id number to a token. A dictionary, therefore, contained tokens that are going to analysis as id number and text.

The number of minimum documents that a token should occur was four where the graph Fig. 4.2 stopped dramatically declining. Similarly, the ratio of the number of maximum documents

¹² See Appendix V: Bigram List

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a token occurred is 0.35 before the graph Fig. 4.3 becomes stable. Finalized tokens are shown in Fig. 4.4. The size of text imitates the frequency of a token in the whole corpus. The bigger the text means the higher its frequency.

4.3.7.1 Corpus 1: Political Statements and Newspaper

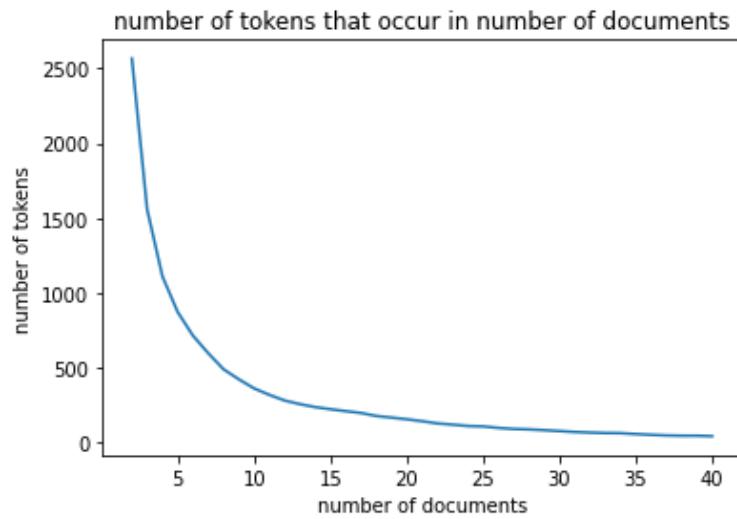


Fig. 4.2 Minimum Political Statements and Newspapers that Tokens Occur

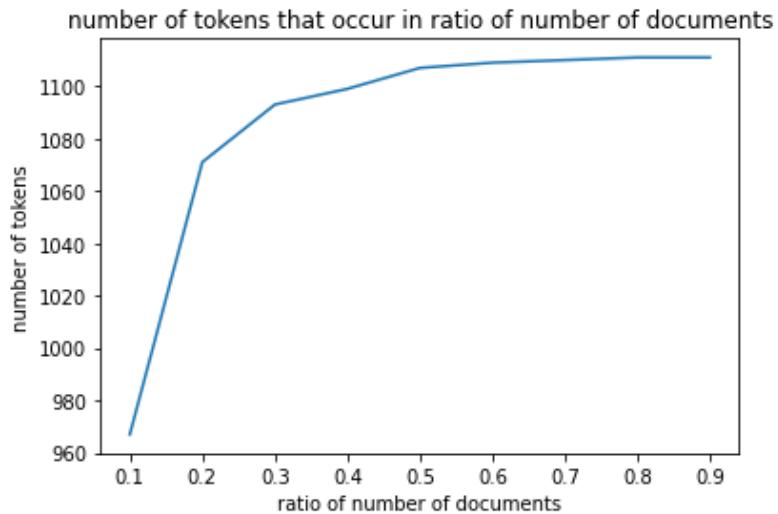


Fig. 4.3 Ratio of Maximum Political Statements and Newspapers that Tokens Occur

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Fig. 4.4 Total Tokens in Corpus 1: Political Statements and Newspaper

4.3.7.2 Corpus 2: Intersected Tokens of Political Statements and Newspaper

The cut-off number of documents is the same as Corpus 1: Political Statements and Newspaper where the number of minimum documents a token should appear was 4, and the ratio of maximum documents a token could appear was 0.35. Finalized intersected tokens are shown in Fig. 4.5 Total Tokens in Corpus 2: Intersected Tokens of Political Statements and Newspaper.



Fig. 4.5 Total Tokens in Corpus 2: Intersected Tokens of Political Statements and Newspaper

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4.3.7.3 Corpus 3: Interview Transcript of Administrative Officers

As illustrated in Fig. 4.6 Minimum Interview Transcripts that Tokens Occur and Fig. 4.7 Ratio of Maximum Interview Transcript that Tokens Occur, the number of minimum documents a token should appear was 4, and the ratio of maximum documents a token could appear was 0.3. Finalized tokens of the corpus are shown in Fig. 4.8 Total Tokens in Corpus 3: Interview Transcript of Administrative Officers.

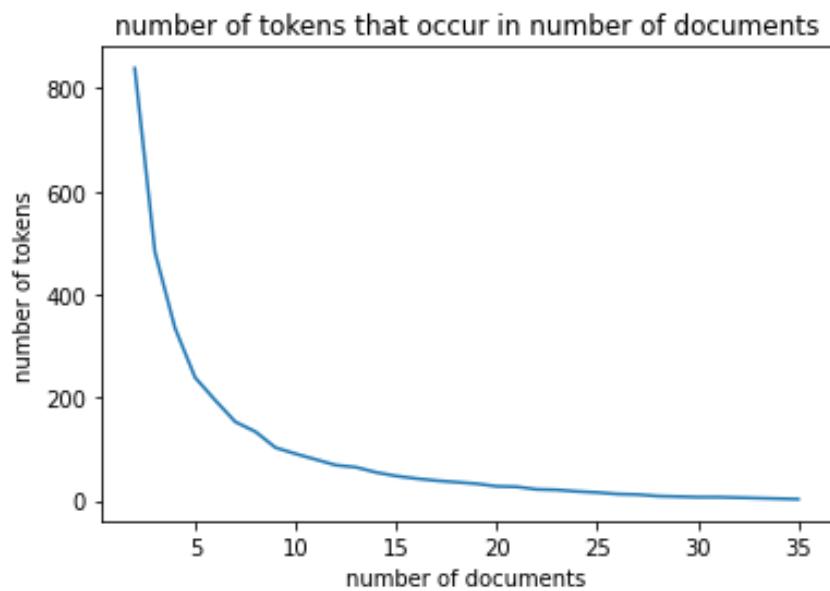


Fig. 4.6 Minimum Interview Transcripts that Tokens Occur

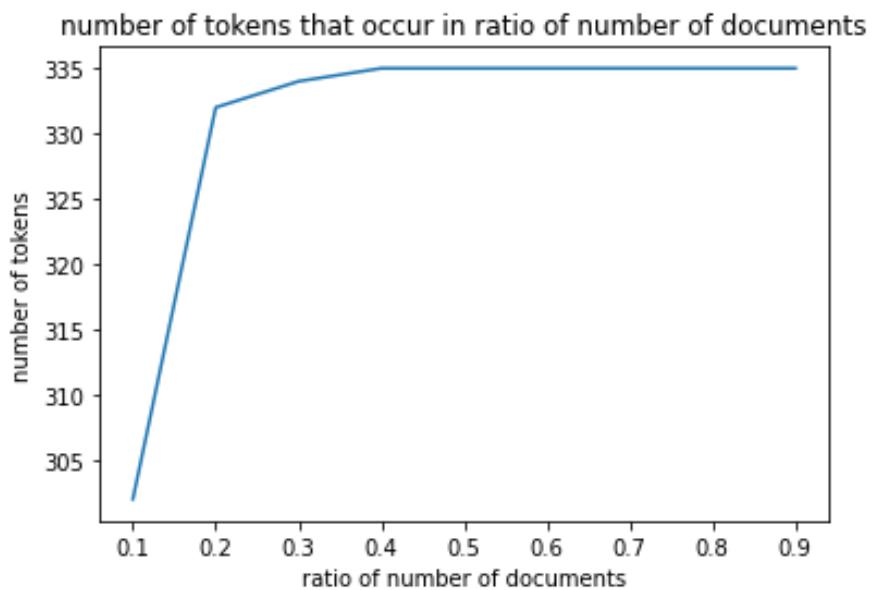


Fig. 4.7 Ratio of Maximum Interview Transcript that Tokens Occur

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Fig. 4.8 Total Tokens in Corpus 3: Interview Transcript of Administrative Officers

4.3.8 Corpus Modification as Bag-Of-Words

According to the dictionaries generated, documents were modified into a Bag-Of-Words considering only tokens in the dictionaries. Bag-Of-Words (BOW) is a matrix of a token as an id number and its occurrence in a document. A corpus contained several BOW of the documents.

Corpus 2 was separated at this point into Corpus 2.1: Newspaper and Corpus 2.2: Political Statements as they were transformed into BOW. Thus, corpus 1: Political Statements and Newspaper, corpus 2: Newspaper, corpus 3: Political Statements, and corpus 4: Interview Transcript of Administrative Officers were modified from tokens to BOW.

4.4 Topic Modeling

Topic modeling discovers patterns of words in documents and the result is topics. It is a clustering problem as there is no specific classification of topics among the documents, and the result is not numeric. The assumption of this problem is each document contains a distribution of various topics, each topic contains a distribution of words, and words that appear together are likely to belong to the same topic.

The topics are latent parameters that are estimated by the algorithm. They contain words that occur together. The model can estimate how much a document contains each topic, and cluster similar documents together. The similarity is in terms of word cooccurrence which implies that the documents contain similar cooccurrence of word choice. It can both reveal similar ideologies as discourse production and discover the reproduction of discourse. Thus, topic modeling is a proposed method for this research.

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4.4.1 Latent Dirichlet Allocation

Latent Dirichlet Allocation (LDA) is a generative probabilistic model which was introduced by Blei in 2003 [48]. It is based on Bayesian inference. Bayesian inference is a statistical inference that uses the Bayes theorem to update the probability as more evidence is discovered.

The main assumption of this model is that words in the same topic are likely to occur together. The topic is a latent parameter estimated by the model. Three adjustable parameters highly affected the result, which are the **number of topics (K)**, the **concentration of topics in a document (α)**, and the **concentration of words in a topic (η)** as shown in Fig. 4.9 Latent Dirichlet Allocation Plate Notation.

(Figure is removed due to copyright.)

Fig. 4.9 Latent Dirichlet Allocation Plate Notation¹³

The plate notation of the model has illustrated in Fig. 4.9 Latent Dirichlet Allocation Plate Notation. There are D documents with N words and K topics in the model, while the illustration demonstrates how word n in document d is generated. The shaded circle represents observations, so, in this algorithm, only words that occurred in the document are observed. While the algorithm observes the occurrence of tokens, the posterior probability is calculated by using the Bayes theorem.

White circles represent unobserved variables. The plate with a capital letter means that there is that number of repetitions. Thus, there are N_d words in document d. The arrow means depending on. For example, θ_d depends on α .

α and η are the prior parameters that reflect the prior belief of the model, which are based on the Dirichlet distribution. It is defined as a positive real value that indicates the sparseness of the distribution which is a distribution of topics in a document or tokens in a topic. If the initial value of the Dirichlet distribution is less than one, the distribution is sparser, or the probability tends to be concentrated. One means that it is uniform or equally distributed. And if the value is more than one, it is more spread out. For example, the lower value for α means that there are fewer topics contained in a document and the probability of those topics is high. Similarly, the lower η means that a topic contains fewer tokens, and their probabilities are high. On the other hand, high α means that there are more topics contained in a document with fewer probabilities, and high η means that there are more tokens contained in a topic with fewer probabilities.

θ and β follow a Dirichlet distribution where the number of topics and number of tokens determine the number of variables, respectively.

¹³ Plate Notation proposed by Blei et al. [49]

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From the left side, θ_d is a topic distribution of document d as a vector, which is generated from the Dirichlet parameter α . Then, a topic for a token is chosen from θ_d as $Z_{d,n}$. This is repeated N times as there are N words observed.

β_k on the right side represents a distribution of dictionary of tokens in topic k, where the total number of topics is K, and a dictionary contains every token as all tokens have some contribution to all topics. It is generated from the Dirichlet parameter η . A topic k is chosen as $Z_{d,n}$ from the left side, a word from that topic is chosen from β . Similarly, this repeats for N times as there are N words.

Gensim package on Python offers Latent Dirichlet Allocation on Python with an opportunity to adjust several parameters including α , η , K, and a number of iterations. It is necessary to set seed values to achieve the same result. The seed value in this research was set to seven.

4.4.2 Coherence Score

Blei et al. suggested that the number of topics can be estimated by perplexity measures [48]. While the perplexity can accurately generate a good result in several cases, interpretability is more important in social science. [49] A good mathematical score of the model does not result in understandable topics for humans. [50] Coherence score, on the other hand, can suggest a model with more interpretable topics.

The C_V is a type of coherence measure which is proposed as an indicator for parameters in this research because it can give more interpretable topics. A good topic model should result in comprehensive topics, or the topics can be labeled by high probability words [26]. C_V was introduced by Röder et al. [51]. It has the best performance in generating the most interpretable topics as it is the most correlated measure with human evaluation. It is a combination of a sliding window, cosine similarity, and normalized PMI (NPMI).

Equation 1: Normalized Pointwise Mutual Information (NPMI)

$$NPMI(x; y) = \frac{pmi(x; y)}{-\log_2(X = x, Y = y)}$$

Equation 2: Vector of NPMI

$$\vec{v}(W') = \left\{ \sum_{w_i \in W'} NPMI(w_i, w_j)^{\gamma} \right\}_{j=1, \dots, |W|}$$

Equation 3: Cosine Similarity

$$\phi s_i(\vec{u}, \vec{w}) = \frac{\sum_{i=1}^{|W|} u_i \cdot w_i}{\|\vec{u}\|_2 \cdot \|\vec{w}\|_2}$$

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NPMI is a normalization of Pointwise Mutual Information (PMI) which is a fraction of how two tokens occur together. Then, it is normalized to the boundary of [-1,+1], where -1 means they do not occur together at all, and 1 means they always occur together.

NPMI of top words is calculated with cooccurrence of the given word and other top words within the sliding window size 110, which results in a set of vectors. Sliding window size 110 means that it considers only 55 tokens before and after the token in order in a document if two tokens occur together. A vector represents the cooccurrence of a top word. The similarities between a vector and the sum of all vectors are calculated using cosine similarity. The C_V measure is the arithmetic mean of the similarities. The formulas are shown above.

4.5 Prediction of Political Statements

Model 2 of the newspaper was used to cluster the political statements to see the intertextuality. Thus, after the model is generated. It was used to predict the topics of political statements.

4.6 Aggregating Topic Contribution by Actors

The results were summarized for each actor. This revealed the probability distribution of topics by different actors. Actors included political parties, newspaper publishers, and interviewees. Statements made by politicians are aggregated into political parties as assuming that any parties in Germany have similar thoughts and standpoints across the country.

The topic contribution of each party or respondent could be viewed as representing their standpoint or ideology.

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Results, Model 1: Political Statements and Newspaper

5 Results

The result of topic modeling reveals the cooccurrence of word choice being used by different actors around the pop-up bike lanes, which in turn is discourse practices by policy entrepreneurs.

5.1 Model 1: Political Statements and Newspaper

Political statements and newspaper data yield the highest C_V coherence score at alpha = 0.6 and eta = 0.05 with 4 topics.

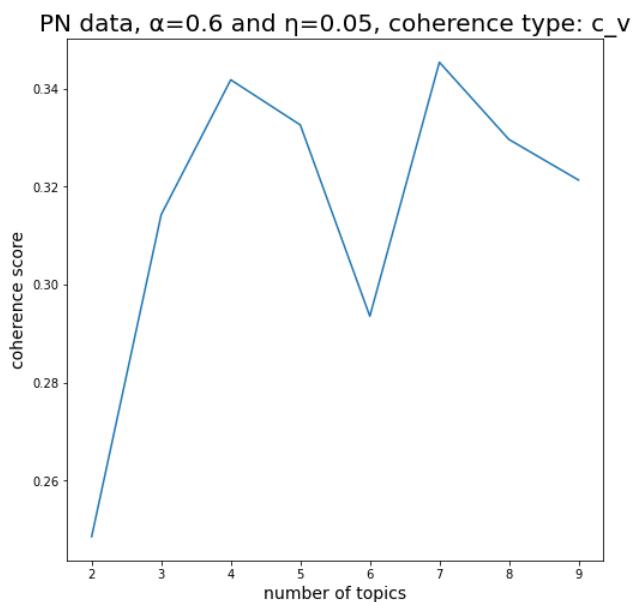


Fig. 5.1 Coherence Score of Corpus 1

Although the parameters of the model including the number of topics (K), the concentration of topics in a document (α), and concentration of words in a topic (η) are chosen from the local highest C_V score or a peak before it declines as shown in Fig. 5.1, four topics can fit with the theory well. ACF states that the coalitions in a policy subsystem are up to four, which in this case, a coalition can be represented by a topic. A topic is defined as a set of word choices' that are cooccurrence.

The high probability tokens in a topic and the keywords imply the theme of the topic. Tokens are listed in Tab. 5.1 according to its probability in the token-topic distribution, which is shown in Fig. 5.2.

Tokens in topic 0 declines sharply until the seventh token. Thus, the first six tokens have high contributions in topic 0, which are council, district, the court, the decision, and justification. Topic 1 starts to be stable at the tenth token. The high probability tokens in topic 1 are about the district council, safety, practical, residents, stelle, parking lot, administrative officers, wide,

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and safe. Topic 2 falls sharply and moderately declines until the thirteenth token. Highly contributing tokens are euro, kilometer, million, crisis, percent, new, red, path, cyclist, roadway, administrative, and clear. Similarly, high probability tokens in topic 3 are the first five tokens which are pedestrians, meter, time, big, and cyclist.

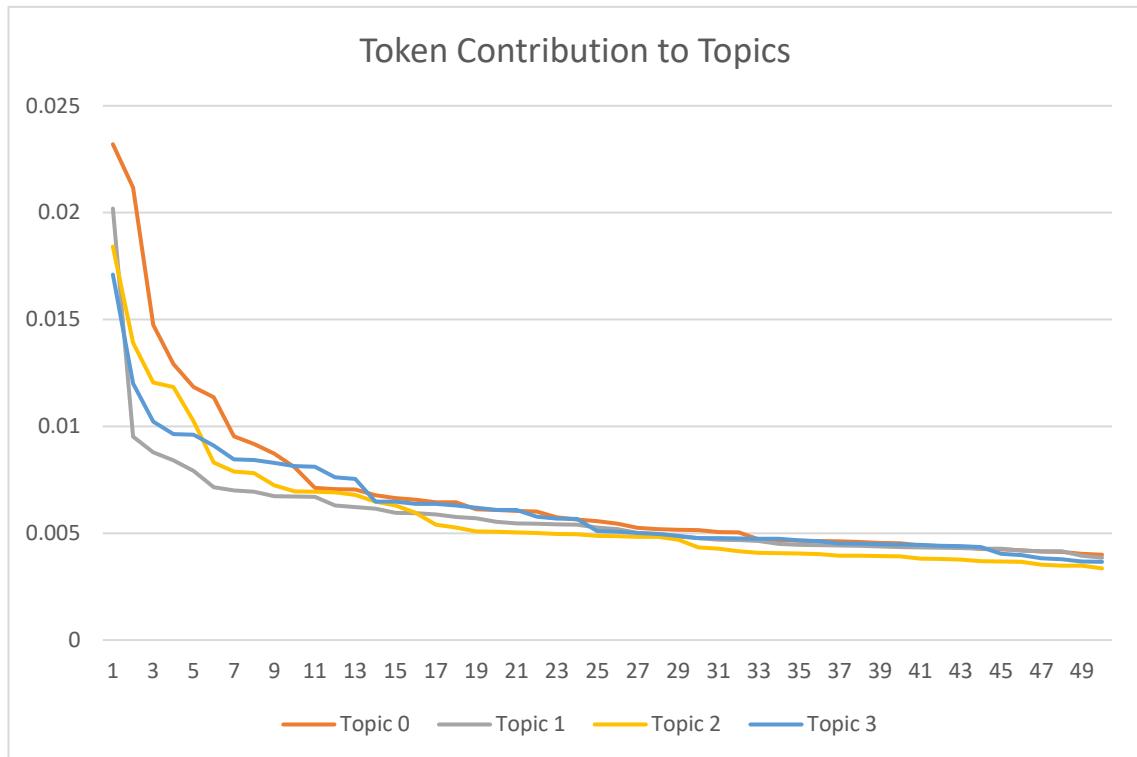


Fig. 5.2 Probability Contribution in Model 1 of Tokens to Topics by Ranking

	Topic 0	Topic 1	Topic 2	Topic 3
1	senat	Stadtrat	euro	fußgänger
2	bezirk	Sicherheit	kilometer	meter
3	gericht	Möglich	million	zeit
4	entscheidung	Anwohner	krise	groß
5	senatsverwaltung	Stelle	prozent	radler
6	begründung	Parkplatz	neue	prozent
7	sicherheit	stadtverwaltung	rot	abstand
8	verwaltungsgericht	Weit	weg	öffentlich
9	urteil	Sichern	radfahrende	breit
10	einrichtung	Projekt	fahrbahn	gehweg
11	verwaltung	Lösung	verwaltung	weg

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	Topic 0	Topic 1	Topic 2	Topic 3
12	anordnung	Polizei	deutlich	schnellen
13	verkehrsverwaltung	problem	ausbau	autoverkehr
14	verwaltungsgerichts	fahrspur	mobilitätswende	situation
15	beschluss	neue	fußgänger	weit
16	beschwerde	initiative	weit	kommune
17	weit	verwaltung	projekt	unfall
18	weg	kind	öffentlich	deutlich
19	oberverwaltungsgericht	spur	zahl	stelle
20	rechtswidrig	radverkehrs	kfz	neue
21	schnellen	antrag	infrastruktur	spur
22	dauerhaft	kreuzung	groß	land
23	verkehrspolitische	autoverkehr	sicherheit	raum
24	gefahr	verkehrswende	lang	möglich
25	coronakrise	radentscheid	schnellen	schmal
26	erforderlich	verkehrssicherheit	hoch	kind
27	provisorisch	vorschlag	gering	stark
28	gelb	autofahrer	nahverkehr	mobilität
29	senatsverkehrsverwaltung	planung	bus	aktion
30	bahn	baulich	aktuell	sichern
31	möglich	bürger	planung	innenstadt
32	radfahrende	schwer	senat	einrichtung
33	notwendig	deutlich	stark	radfahrende
34	mobilität	sicht	meter	krise
35	kurzfristig	stau	radler	aktuell

Tab. 5.1 Tokens in Topics of Model 1

	Topic 0	Topic 1	Topic 2	Topic 3
AfD	0.715	0.116	0.092	0.076
CDU	0.393	0.304	0.082	0.221
CSU	0.169	0.628	0.181	0.023
Die Linke	0.273	0.169	0.364	0.194
FDP	0.233	0.177	0.457	0.132

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	Topic 0	Topic 1	Topic 2	Topic 3
Grüne	0.114	0.252	0.200	0.434
SPD	0.118	0.537	0.128	0.217

Tab. 5.2 Probability Distribution of Topics in Model 1 by Political Parties

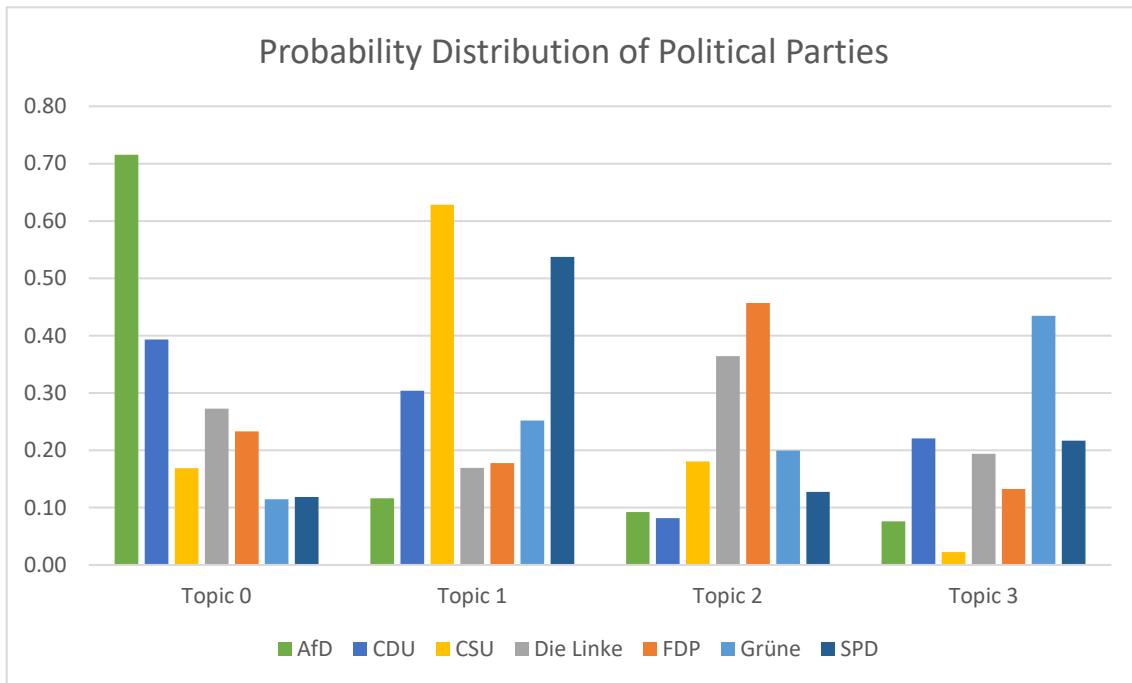


Fig. 5.3 Topic Probability Distribution of Political Parties in Model 1

Fig. 5.3 shows that each topic has at least one political party with a high probability. A topic can represent their actions regarding the policy core belief of the coalition as they compete in the subsystem. The comparison between parties regarding the high concentration in a topic is carried out.

Grüne is the only party who has a high probability in topic 3 according to Fig. 5.3. According to tokens that have high contribution in topic 3, the topic is about pedestrians and cyclists regarding the pop-up bike lanes, characteristics of the bike lanes, and social distancing in the public involving the pop-up bike lanes. Nevertheless, the contribution by Grüne is less than 0.5 and other parties contribute around half of Grüne to this topic including CDU, Die Linke, and SPD.

Meanwhile, AfD and CDU highly involve in topic 0 which is about the courts and their decision in pop-up bike lanes and justification of the bike lanes. AfD has a distinct contribution in topic 0 while CDU contributes a similar amount in topic 1 and topic 3. Topic 1 is about the practicality

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of the pop-up bike lanes and topic 3 is about pedestrians, cyclists, characteristics of bike lanes, and the time.

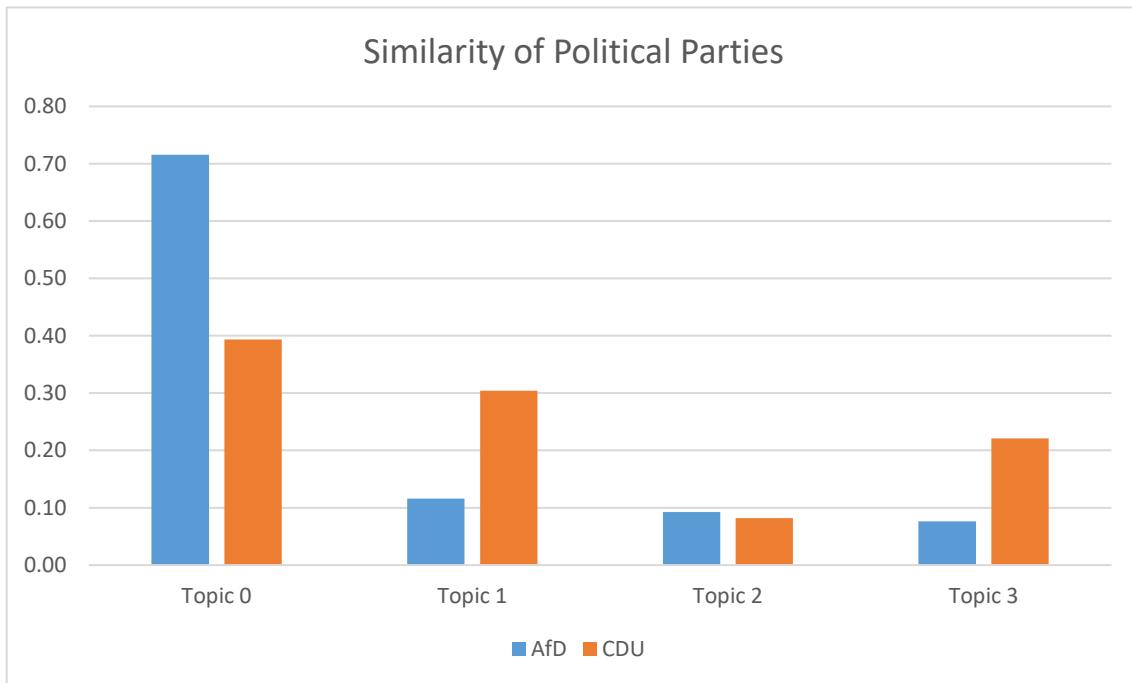


Fig. 5.4 Similarity of AfD and CDU

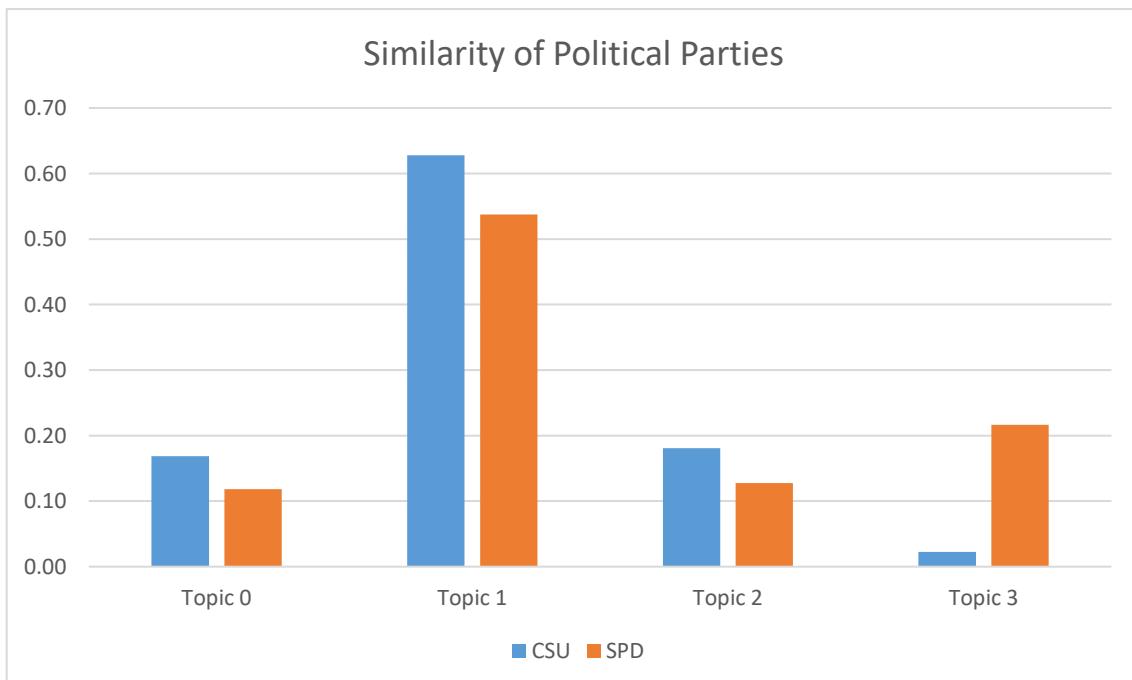


Fig. 5.5 Similarity of CSU and SPD

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Then, topic 1 is highly engaged by CSU and SPD as shown in Fig. 5.5. The theme of topic 1 is about the district council who responsible for the bike lanes, safety in cycling, the practicality of pop-up bike lanes, and conflicts of parking space, residents, and bike lanes. The figure also illustrates that CSU and SPD rarely engage in other topics. This topic can represent the policy core belief of the coalition.

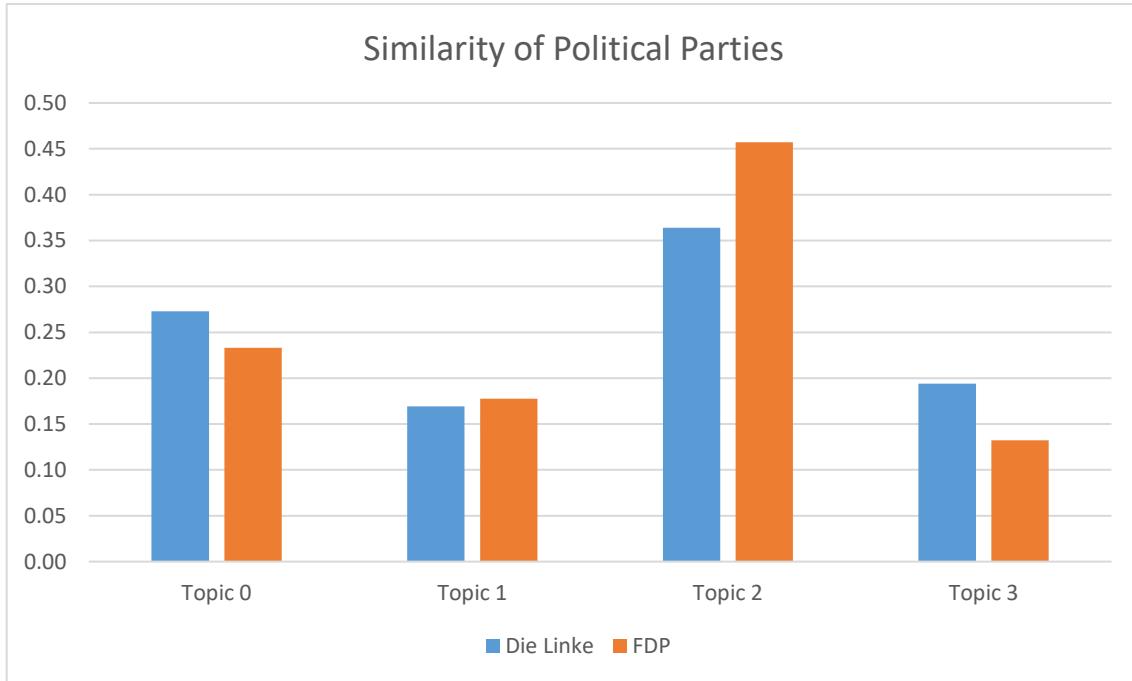


Fig. 5.6 Similarity of Die Linke and FDP

Fig. 5.6 depicts that topic 2 has the highest contribution by both parties. The high probability tokens in topic 2 are about the investment of pop-up bike lanes and the bike lanes in the crisis. However, their contribution to topic 2 is not distinct as their contribution to topic 2 is less than 0.5 and they also have a substantial contribution to the other three topics.

	Topic 0	Topic 1	Topic 2	Topic 3
Abendzeitung	0.172	0.618	0.098	0.112
Berliner-Zeitung	0.592	0.024	0.267	0.117
Bietigheimer Zeitung	0.349	0.566	0.023	0.062
Bild	0.287	0.179	0.221	0.313
Hamburg Press Achieve	0.027	0.008	0.957	0.008
Leipziger Zeitung	0.189	0.243	0.270	0.298
LVZ	0.129	0.081	0.281	0.509
Morgenpost	0.033	0.045	0.398	0.524

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	Topic 0	Topic 1	Topic 2	Topic 3
RND	0.312	0.024	0.270	0.394
Stuttgarter-zeitung	0.076	0.306	0.281	0.336
Süddeutsch Zeitung	0.006	0.389	0.201	0.405
Tagesspiegel	0.388	0.080	0.258	0.274
TAZ	0.300	0.127	0.214	0.359
Welt	0.436	0.071	0.343	0.150
Weser-Kurier	0.018	0.117	0.573	0.292

Tab. 5.3 Probability Distribution of Topics in Model 1 by Newspaper

The probability distributions of the newspaper are shown in Tab. 5.3. A similarity between newspaper and political parties has been found. Some newspapers highly contribute to some topics, which is similar to some political parties.

For example, Abendzeitung and Bietigheimer Zeitung highly engage in topic 1 like CSU and SPD as shown in Fig. 5.8. LVZ, Morgenpost, Stuttgarter-zeitung, Süddeutsch Zeitung and Weser-Kurier have high concentration in topic 2 which is similar to Grüne and Die Linke as shown in Fig. 5.9. Lastly, some newspapers resemble the AfD as well such as Berliner-Zeitung, Tagesspiegel, and Welt as shown in Fig. 5.10. The reproduction of political statements in the newspaper will be evaluated in the following section.

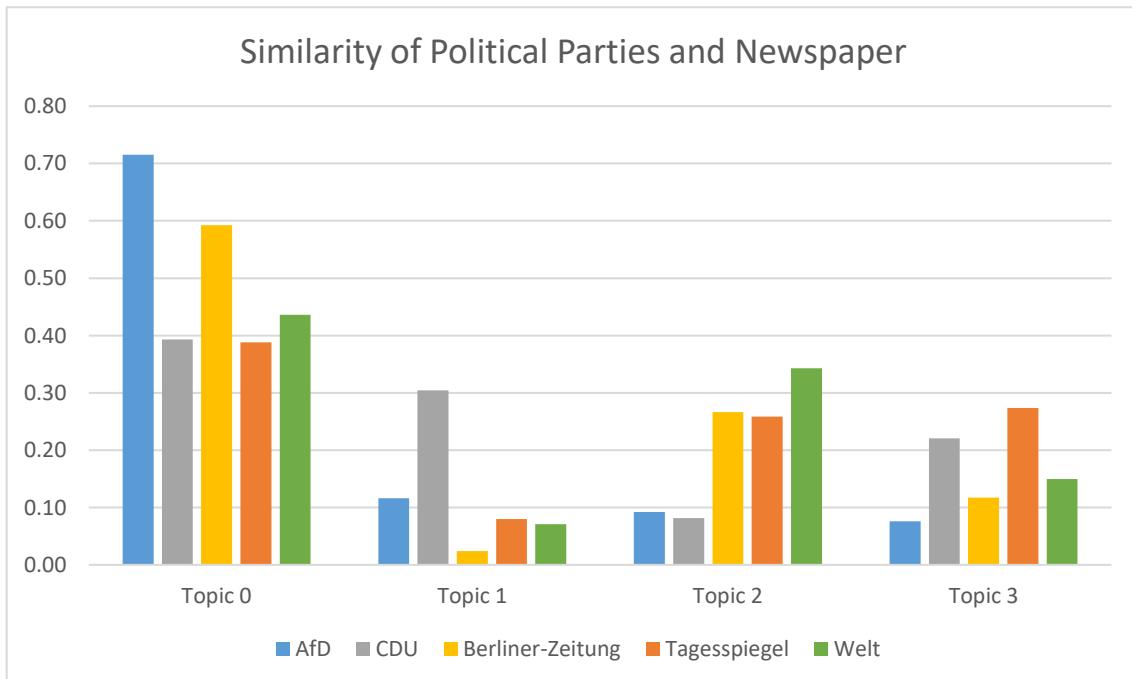


Fig. 5.7 Similarity of AfD, CDU, and some newspapers

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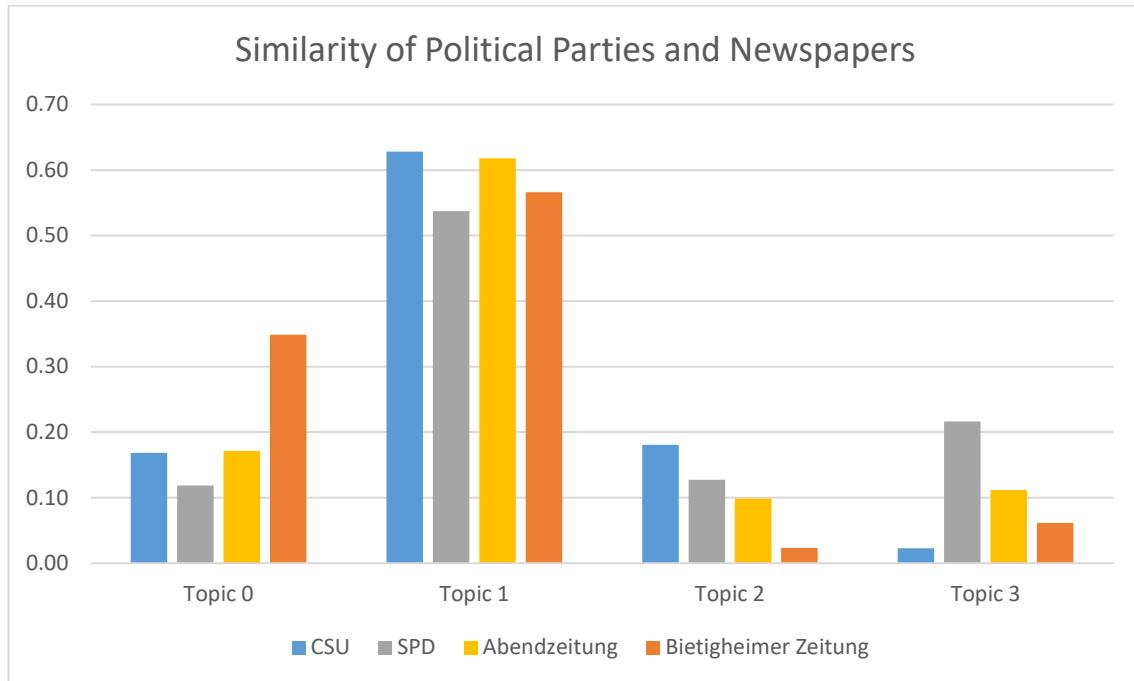


Fig. 5.8 Similarity of CSU, SPD, and some newspapers

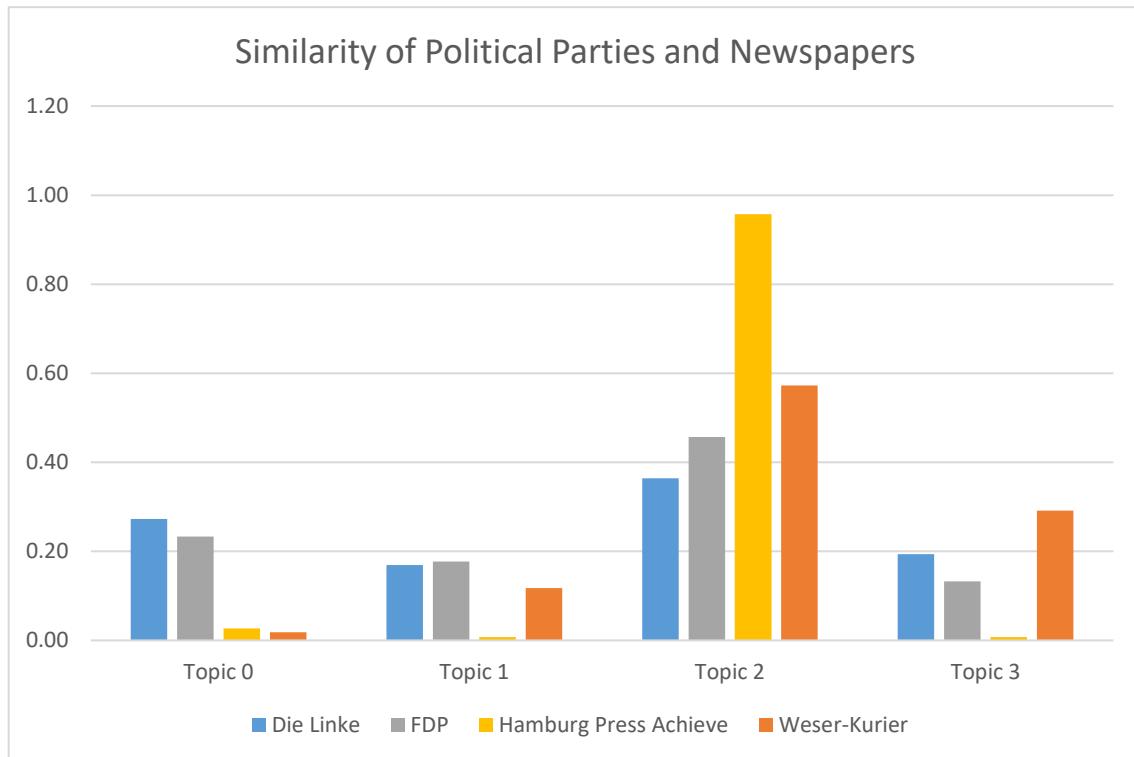


Fig. 5.9 Similarity of Die Linke, FDP, and some newspapers

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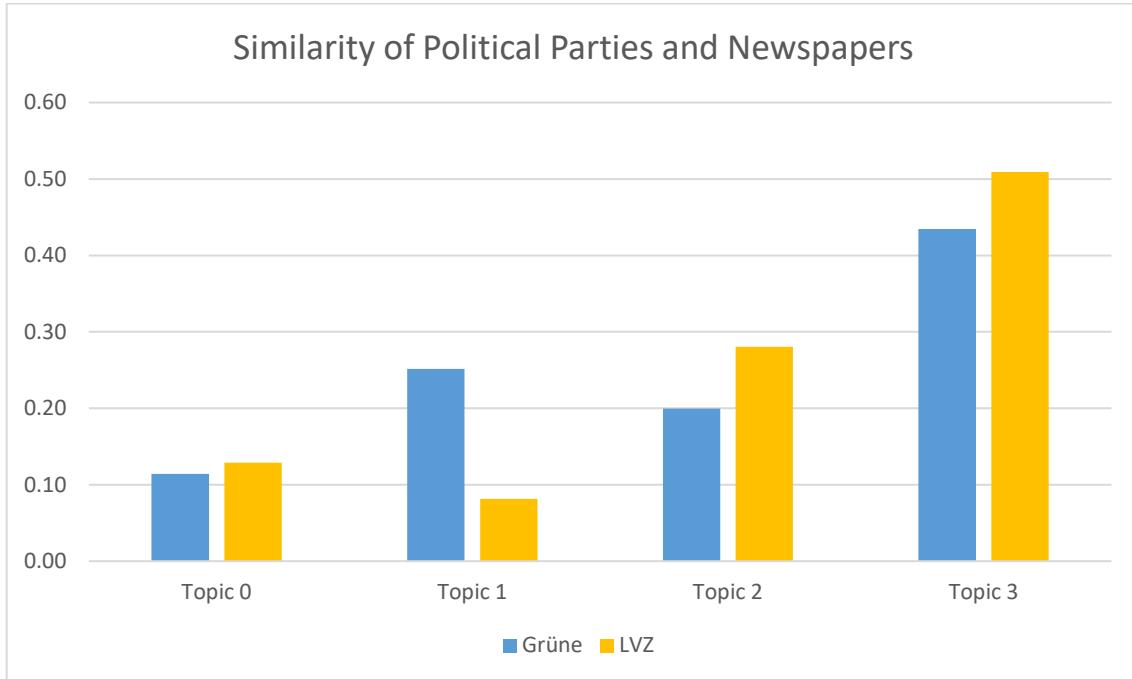


Fig. 5.10 Similarity of Grüne and some newspapers

5.2 Model 2: Newspaper

Newspaper data yields the highest C_V coherence score at alpha = 0.6 and eta = 0.05 with 4 topics, which is the same as the previous model. Thus, the model has the same prior belief of the data before observations. C_V score is shown in Fig. 5.11, it is high at four to six topics before it drops. Thus, a model with four topics was chosen because it is similar to model 1.

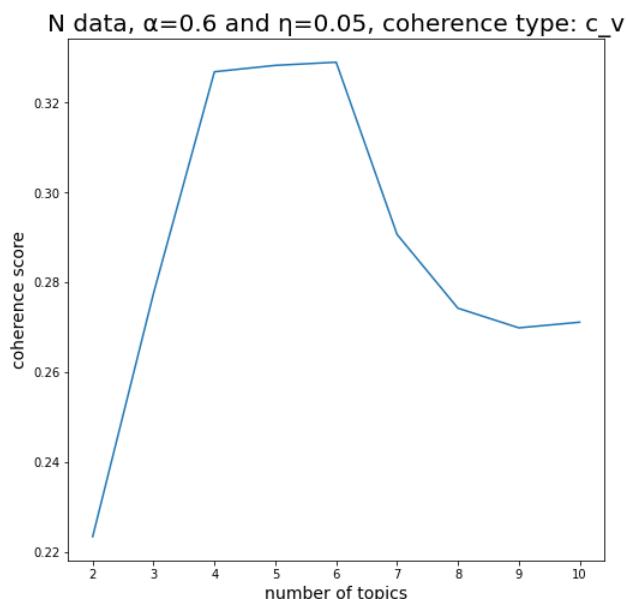


Fig. 5.11 Coherence Score of Corpus 2.1: Newspaper

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Results, Model 2: Newspaper

Intertextuality is being examined here as cooccurrences of word choices in the reproduction of political discourse in the newspaper whether the political statements from parties in the newspaper truly resemble the original one. If the discourses by political parties are reproduced, the cooccurrence of word choice should be detectable.

Tab. 5.4 and Fig. 5.12 reveal high probability tokens in topics. The theme of the topic can be interpreted by tokens and keywords. Topic 0 declines sharply until the seventh token. Therefore, the high probability tokens in topic 0 are the courts, the council, justification, judgement, and the administrative. The probability of tokens in topic 1 declines until the fifth token, thus, high probability tokens are district, council, the pandemic, and the decision. Topic 2 declines moderately until the ninth token, thus, it contains tokens of the pedestrian, euro, cyclist, million, way, percent, footpath, and new. Topic 3 moderately declines until the fifth token; therefore, it contains tokens about kilometers, meter, wide, and safety.

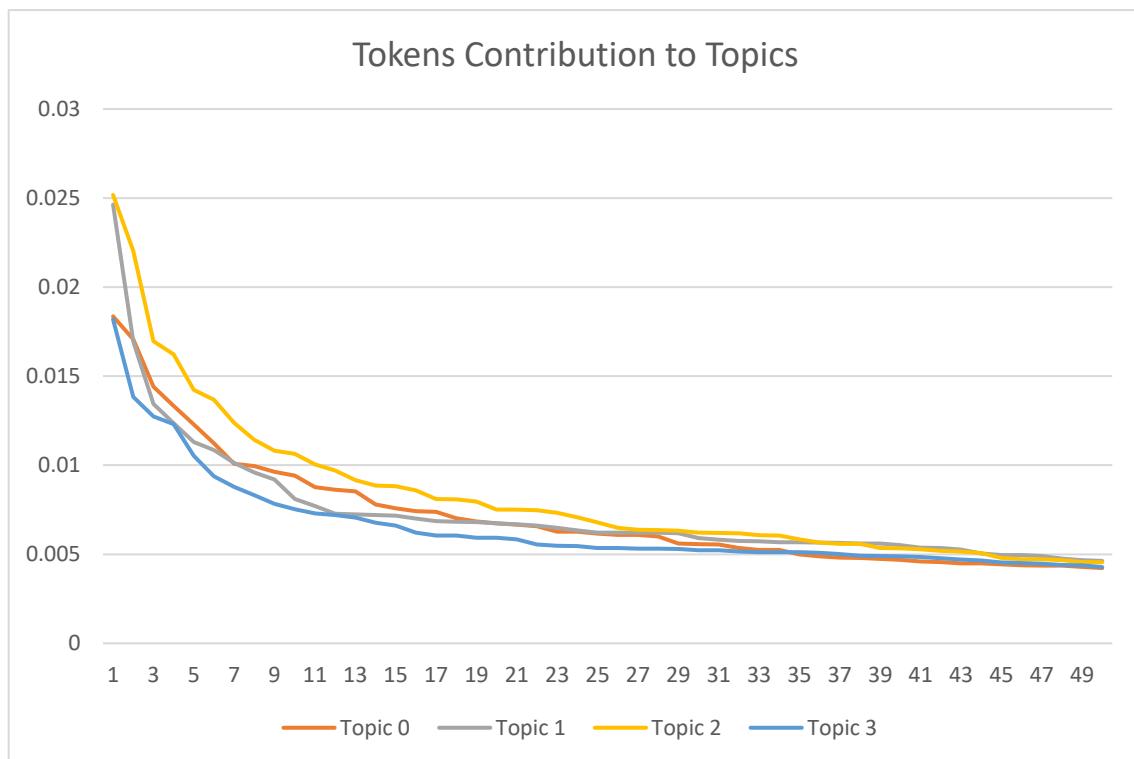


Fig. 5.12 Probability Contribution in Model 2 of Tokens to Topics by Ranking

	Topic 0	Topic 1	Topic 2	Topic 3
1	gericht	bezirk	fußgänger	kilometer
2	senat	senat	euro	meter
3	begründung	coronakrise	radler	weit
4	urteil	entscheidung	million	sicherheit

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Results, Model 2: Newspaper

	Topic 0	Topic 1	Topic 2	Topic 3
5	entscheidung	sicherheit	weg	prozent
6	senatsverwaltung	radfahrende	prozent	groß
7	verwaltung	unfall	gehweg	adfc
8	krise	senatsverwaltung	neue	mobilitätswende
9	verkehrsverwaltung	spur	innenstadt	schnellen
10	verwaltungsgericht	radspuren	situation	stadtrat
11	dauerhaft	planung	fahrbahn	radfahrende
12	beschluss	stark	deutlich	ergebnis
13	projekt	stelle	ausbau	planung
14	partei	möglich	verwaltung	neue
15	neue	gefahr	groß	bezirk
16	gefährtenlage	deutsch	stelle	deutlich
17	verwaltungsgerichts	lkw	meter	polizei
18	erforderlich	initiative	richtung	möglich
19	weit	verwaltungsgericht	land	umsetzung
20	anwohner	provisorisch	zeit	senat
21	sicht	kreuzung	möglich	bezirksamt
22	antrag	kommune	spur	radfahren
23	rechtswidrig	weg	bus	autoverkehr
24	anordnung	fahrradweg	kilometer	mitte
25	einrichtung	hoch	autoverkehr	abstand
26	autoverkehr	autofahrer	weit	parkplatz
27	ziel	oberverwaltungsgericht	schnellen	uhr
28	grund	autoverkehr	radverkehrs	route
29	mobilität	grund	breit	stelle
30	zahl	chance	mobilität	fahrspur
31	senatsverkehrsverwaltung	lang	radfahrern	erste
32	möglich	krise	schmal	sternfahrt
33	problem	schwer	bahn	infrastruktur
34	verkehrswende	warnbaken	autofahrer	aktuell
35	hintergrund	schnellen	bereich	richtung

Tab. 5.4 Tokens in Topics of Model 2

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	Topic 0	Topic 1	Topic 2	Topic 3
AfD	0.559	0.165	0.115	0.161
CDU	0.353	0.189	0.267	0.190
CSU	0.200	0.023	0.172	0.605
Die Linke	0.278	0.166	0.319	0.238
FDP	0.319	0.135	0.350	0.197
Grüne	0.180	0.191	0.328	0.302
SPD	0.178	0.101	0.286	0.435

Tab. 5.5 Topics Probability Prediction of Political Statements by Model 2

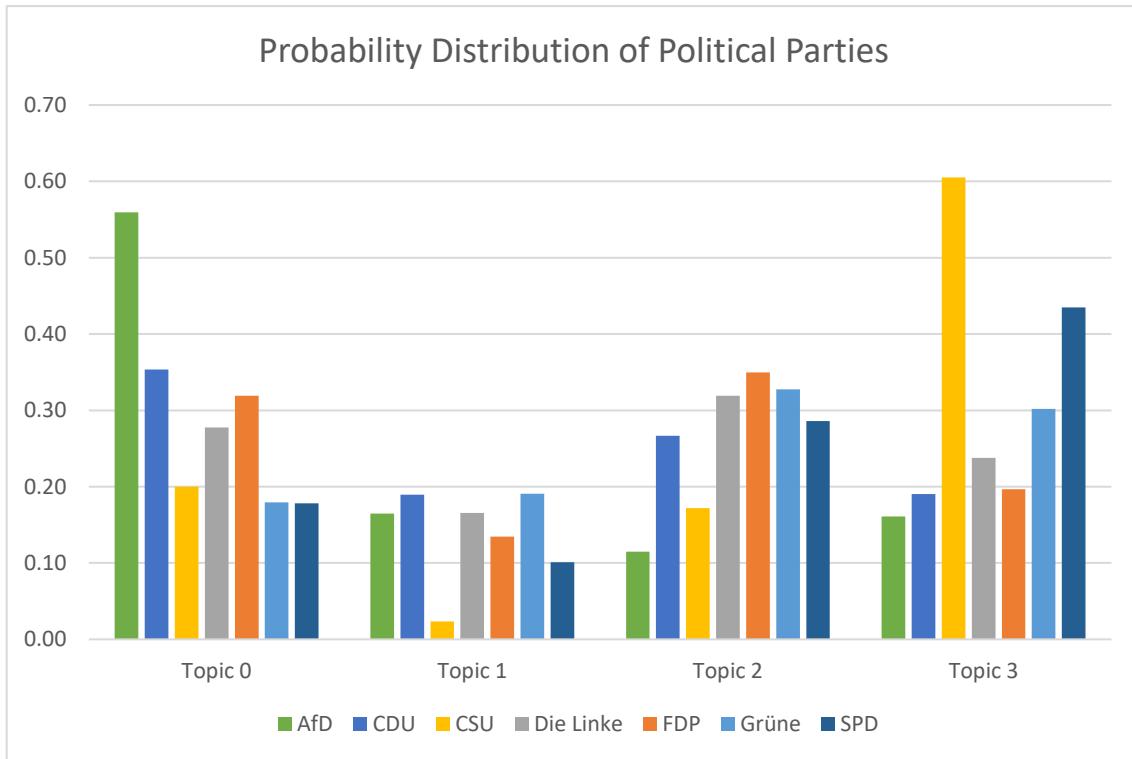


Fig. 5.13 Topics Probability Prediction of Political Statements by Model 2

Although the model cannot be compared directly, the cooccurrence of word choice should be detectable if newspapers reproduce the political statements in the same manner.

As seen in Fig. 5.13, AfD and CSU are distinct regarding cooccurrence of word choice in original political statements comparing to the reproduction of newspapers. AfD contributes the most in topic 0 which is about the courts and their decisions of the pop-up bike lanes while CSU contributes to topic 3. Topic 3 is about the length, width, and safety of the bike lanes.

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On the other hand, other parties equally contribute to all topics and have no topic with a high contribution. The cooccurrence of word choice is not detectable by the topic modeling of newspapers. Besides, contribution by political parties in topics is not as distinct as the clustering model, and it is noticeable that topic 1 has the least contribution overall.

The cooccurrences of word choice in the newspaper do not resemble all the political parties as the intertextuality of several parties have not been seen.

5.3 Model 3: Interview Transcript of Administrative Officers

Interview transcript of administrative officers yields the highest C_V coherence score at alpha = 1.2 and eta = 0.05 with 8 topics.

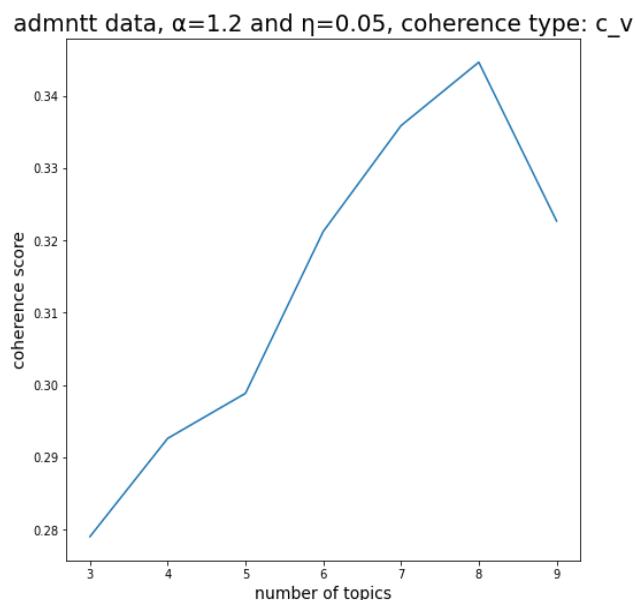


Fig. 5.14 Coherence Score of Corpus 3

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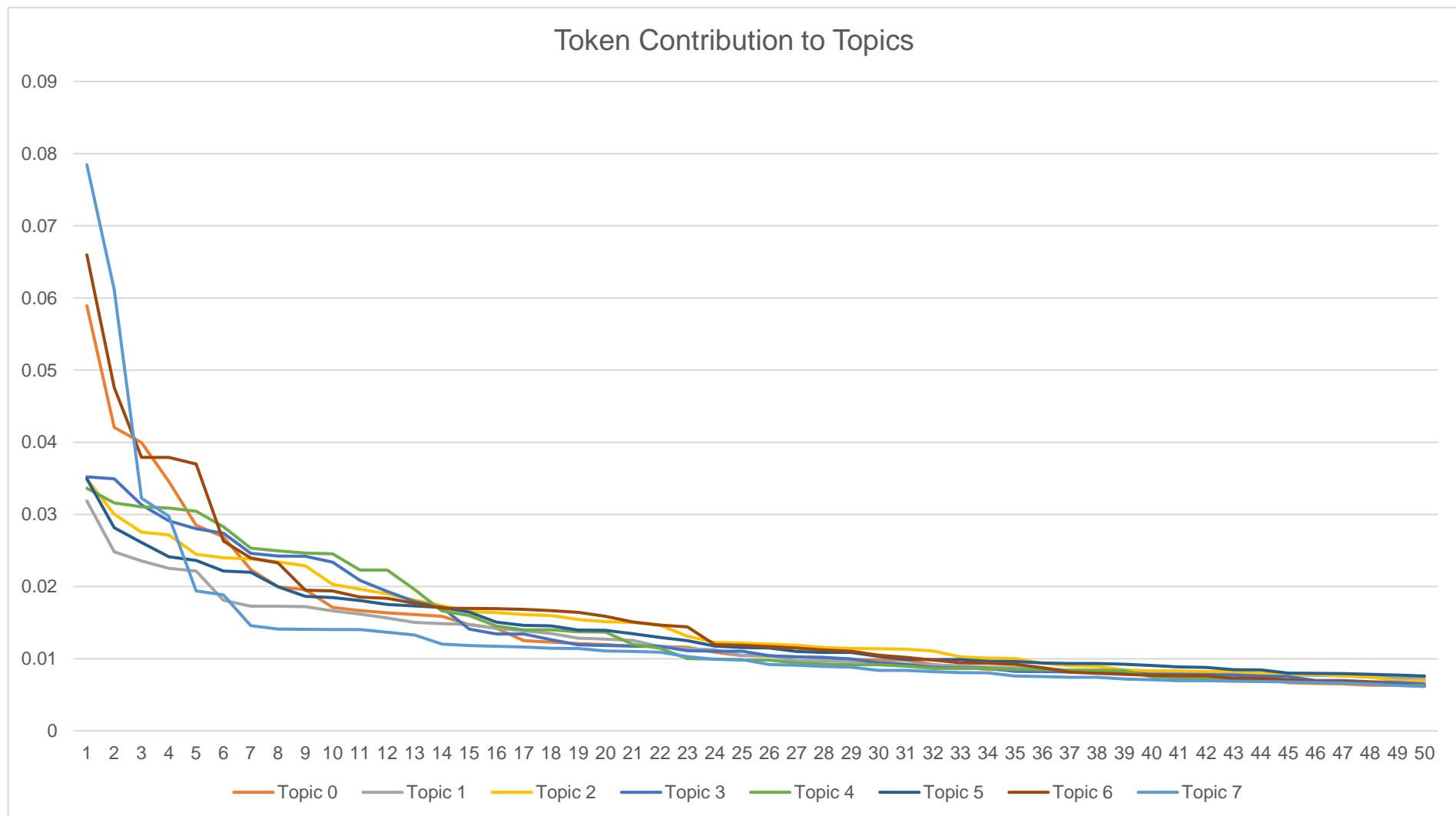


Fig. 5.15 Probability Contribution in Model 3 of Tokens to Topics by Ranking

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	Topic 0	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
1	mobilitätsgesetz	abteilung	bezirk	verwaltung	stadt	baulich	druck	straße
2	anordnung	schnellen	krise	stark	verwaltung	schnellen	parkplatz	planung
3	radweg	kollege	schnell	thema	projekt	möglichkeit	grund	maßnahme
4	radfahrstreifen	stelle	auto	bezirk	politisch	schnell	thema	senatsverwaltung
5	gesetz	markierung	deutlich	zivilgesellschaft	austausch	prozeß	pop-up	stadt
6	straße	bezirk	grundsätzlich	druck	frage	temporär	positiv	radweg
7	verkehr	prozess	problem	verschieden	pop-up	art	meinung	pop-up
8	temporär	bedenken	pandemie	weit	richtig	verfahren	prinzip	raum
9	infrastruktur	straßenverkehrsb ehörde	initiative	person	fahrrad	senatsebene	bisschen	kreuzung
10	kommune	barke	zeit	interesse	bisschen	regelpläne	mensch	verständnis
11	bus	radverkehr	entscheidung	neue	öffentlich	umsetzung	bezirk	verkehrslenkung
12	straßenverkehrs ordnung	projekt	radverkehr	politik	seite	polizei	moment	akzeptanz
13	bezirk	idee	situation	teil	parken	straße	anfrage	erfahrung
14	breit	senatsverwaltung	strecke	möglich	thema	lösung	umsetzung	verfügung
15	radverkehrsanla gen	planung	bisschen	struktur	diskussion	strecke	zeit	bevölkerung
16	begründung	temporärradweg	amt	tisch	eigen	fall	hoch	dauerhaft
17	planung	teil	neu	stelle	bereich	projekt	spielstraßen	abwägung
18	auto	ort	notwendigkeit	moment	punkt	druck	öffentliche raum	verkehr

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	Topic 0	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
19	schlecht	kapazität	fahrspur	gedanke	ebene	akteur	wahrscheinlich	früh
20	ordnung	rechtlich	spur	amtsleiter	veränderung	radweg	bus	alt
21	radverkehr	lang	behörde	pop-up	wahrnehmung	pop-up	extrem	bus
22	instrument	zuständig	radweg	personal	stark	temporärmaßnahme	medium	radverkehr
23	kfz	täglich	platz	firma	kollege	schritt	stimme	auto
24	land	problem	radverkehrsanlagen	anordnung	personal	notwendig	kontakt	zukunft
25	fließend	verkehr	infrastruktur	politisch	geschichte	direkt	gutes	richtig
26	personal	massiv	verkehr	gefühl	temporär	straßenbaulastträger	situation	schön
27	spur	vorgesetzte	grund	kopf	straße	infrastruktur	fahrzeug	eigene
28	sinn	abstimmung	richtig	hintergrund	häufig	positiv	kritisch	vorteil
29	amt	schnell	bewegung	zusammenarbeit	politische	gewiß	schnellen	hauptverkehrsstraße n
30	ausschreibung	ergebnis	chance	entsprechen	situation	weit	neu	privat
31	art	gelb	argument	unterschiedlich	weg	stelle	üblich	radverkehrsanlage
32	stau	temporär	total	krise	schwierig	komplett	maßnahme	bezirk
33	geschützt	offen	gefährlich	neu	idee	schwierig	krise	ungefähr
34	schnellen	fall	gemeinsam	vollkommen	fall	eindruck	frage	mobilitätsgesetz

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	Topic 0	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
35	punkt	direkt	sicht	arbeit	schlecht	ordnungsamt	sichern	radfahrstreifen

Tab. 5.6 Tokens in Topics of Model 3

	Location	Topic 0	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7
Position A	Friedrichshain-Kreuzberg, Berlin	0.083	0.075	0.072	0.168	0.118	0.127	0.277	0.080
Position B	Friedrichshain-Kreuzberg, Berlin	0.128	0.125	0.190	0.073	0.163	0.201	0.065	0.055
Position C	Steglitz-Zehlendorf, Berlin	0.104	0.199	0.171	0.089	0.099	0.091	0.103	0.146
Position D	Steglitz-Zehlendorf, Berlin	0.111	0.115	0.178	0.112	0.127	0.074	0.152	0.131
Position E	Tempelhof-Schöneberg, Berlin	0.133	0.155	0.111	0.134	0.112	0.104	0.107	0.142
Position F	Tempelhof-Schöneberg, Berlin	0.096	0.106	0.146	0.153	0.122	0.093	0.167	0.116
Position G	Bremen	0.208	0.171	0.062	0.077	0.092	0.083	0.080	0.227
Position H	Bremen	0.084	0.049	0.131	0.056	0.232	0.080	0.087	0.281
Position J	Bremen	0.098	0.166	0.097	0.114	0.155	0.135	0.112	0.124
Position K	Stuttgart	0.073	0.077	0.074	0.130	0.091	0.092	0.331	0.132
Position L	Stuttgart	0.074	0.118	0.115	0.118	0.111	0.097	0.209	0.157
Position M	Stuttgart	0.161	0.154	0.215	0.098	0.079	0.149	0.069	0.075
Position N	Stuttgart	0.077	0.145	0.075	0.094	0.172	0.218	0.117	0.102

Tab. 5.7 Probability Distribution of Topics in Model 3 by Administrative Officers

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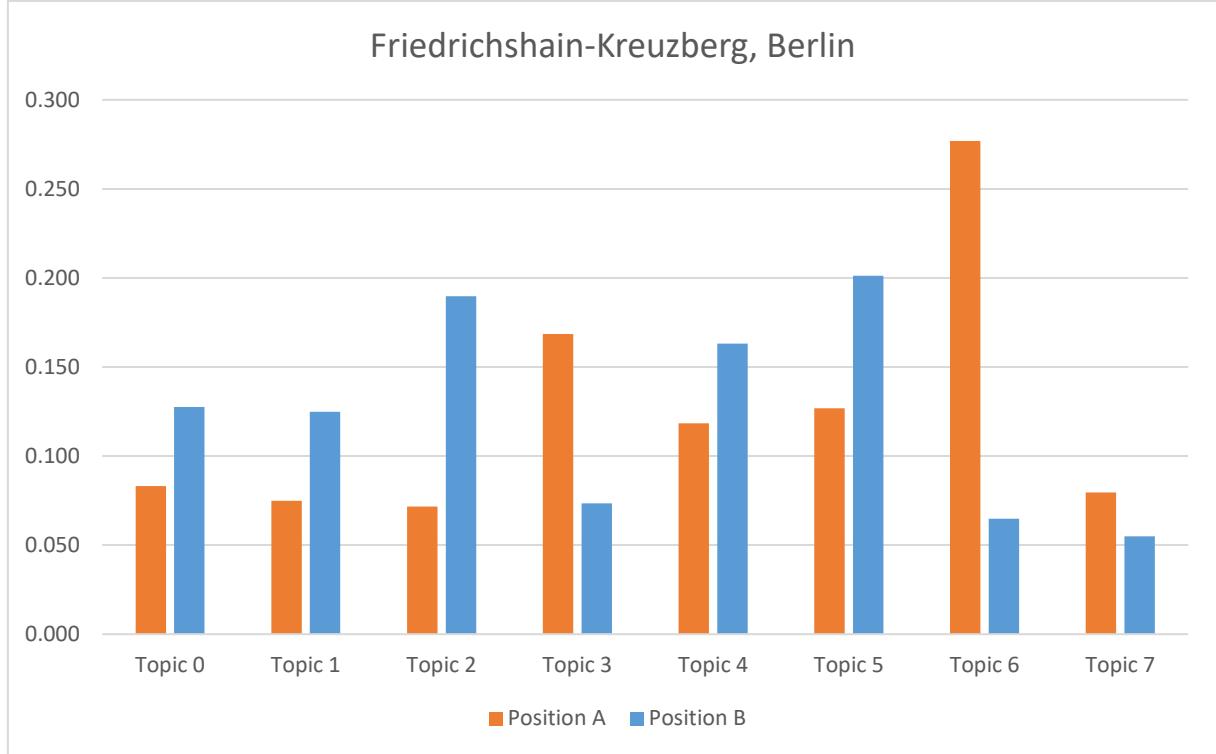


Fig. 5.16 Topic Probability Distribution of Actors in Friedrichshain-Kreuzberg, Berlin

Friedrichshain-Kreuzberg is the district in Berlin that implemented the pop-up bike lanes the most [52]. Two positions investigated have different contributions in nearly all topics, except topic 7. Topic 7 contains tokens of street, planning, measurement, administrative officers, city, and bike lanes, which can imply that the topic is about the measurement of the crisis as pop-up bike lanes. Their high contribution in all topics can imply that they acknowledge both problems and policies as in problem stream and policy stream, and they have successfully implemented the pop-up bike lanes.

On the other hand, two positions in Steglitz-Zehlendorf have similar topic distribution and have the highest contribution in topic 1 as shown in Fig. 5.17. Topic 1 is about the fast process, the department, and colleagues regarding the pop-up bike lanes. However, there is no implementation of the measurement in this district [52]. The contribution of position E in Tempelhof-Schöneberg depicts in Fig. 5.18. It fairly spreads out, while position F has high concentrated contribution in topic 3 and is equally distributed in other topics. Topic 3 is about the pressure of civil society. This implies that position F noticed the pressure by the civil society significantly more than the district council while both engaged similarly in other topics. However, both districts have no implementation of the pop-up bike lanes.

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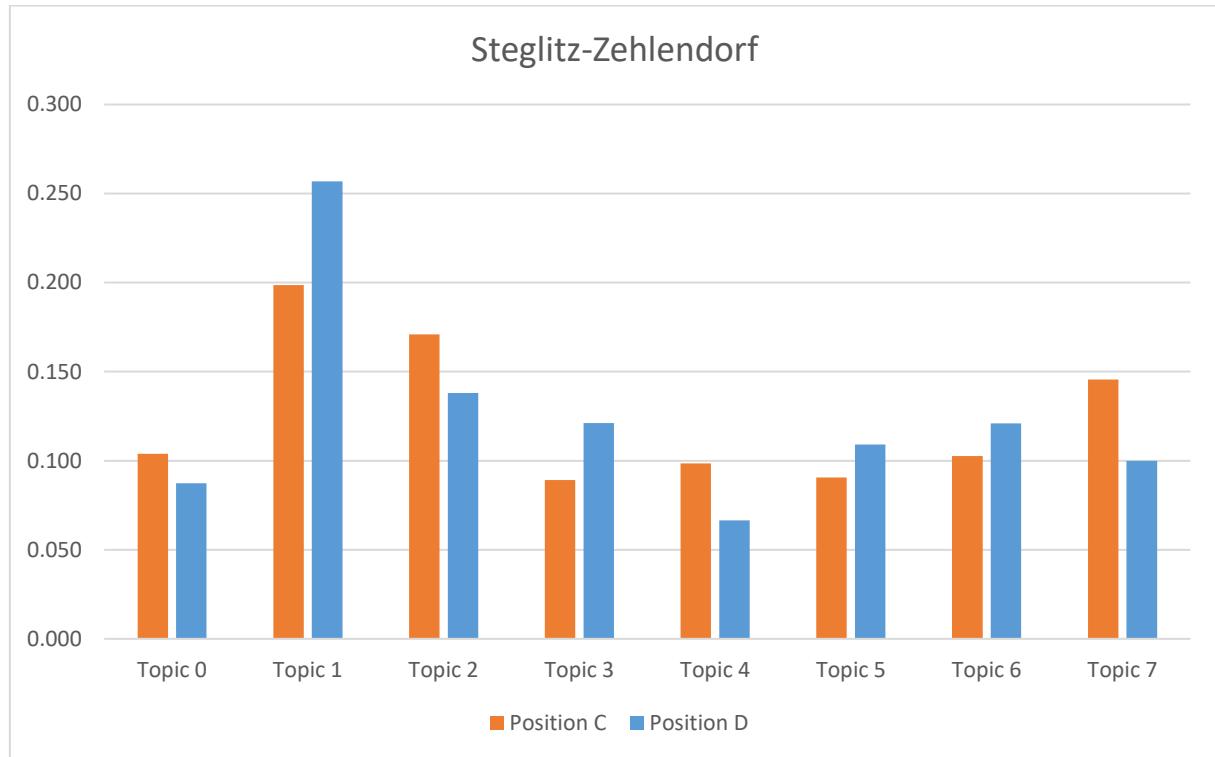


Fig. 5.17 Topic Probability Distribution of Actors in Steglitz-Zehlendorf, Berlin

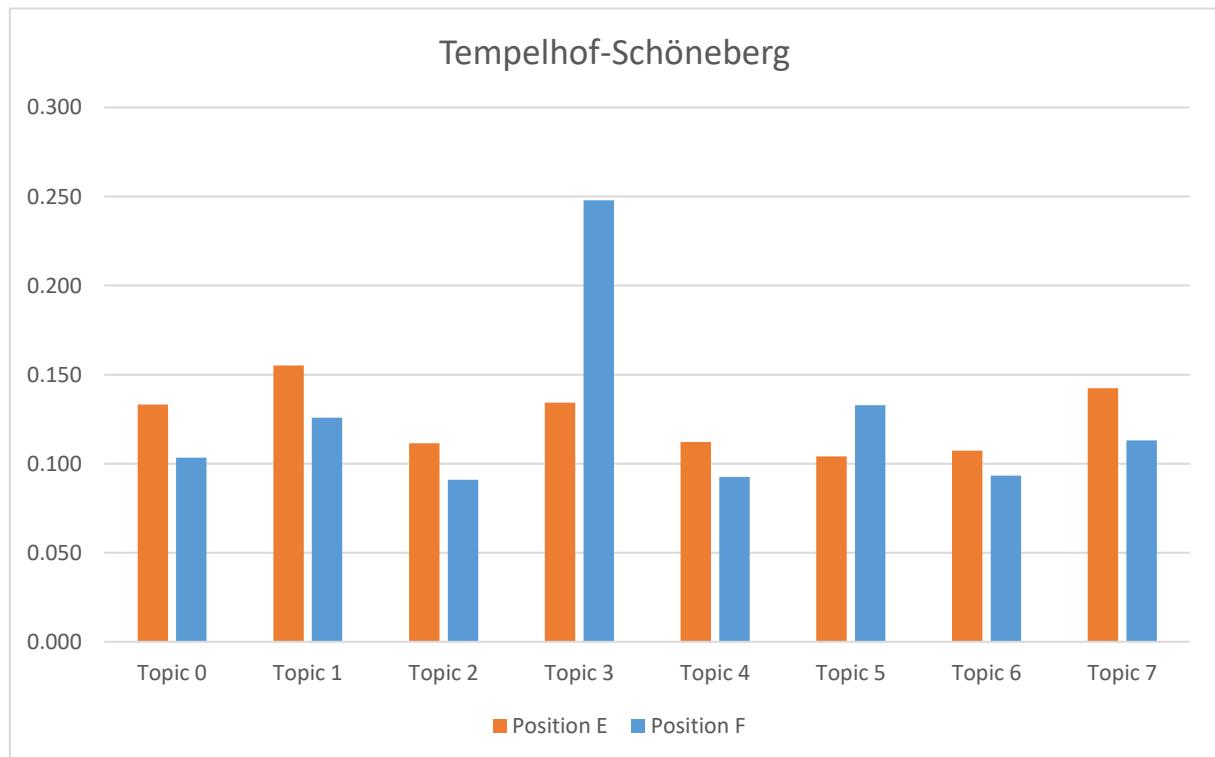


Fig. 5.18 Topic Probability Distribution of Actors in Tempelhof-Schöneberg, Berlin

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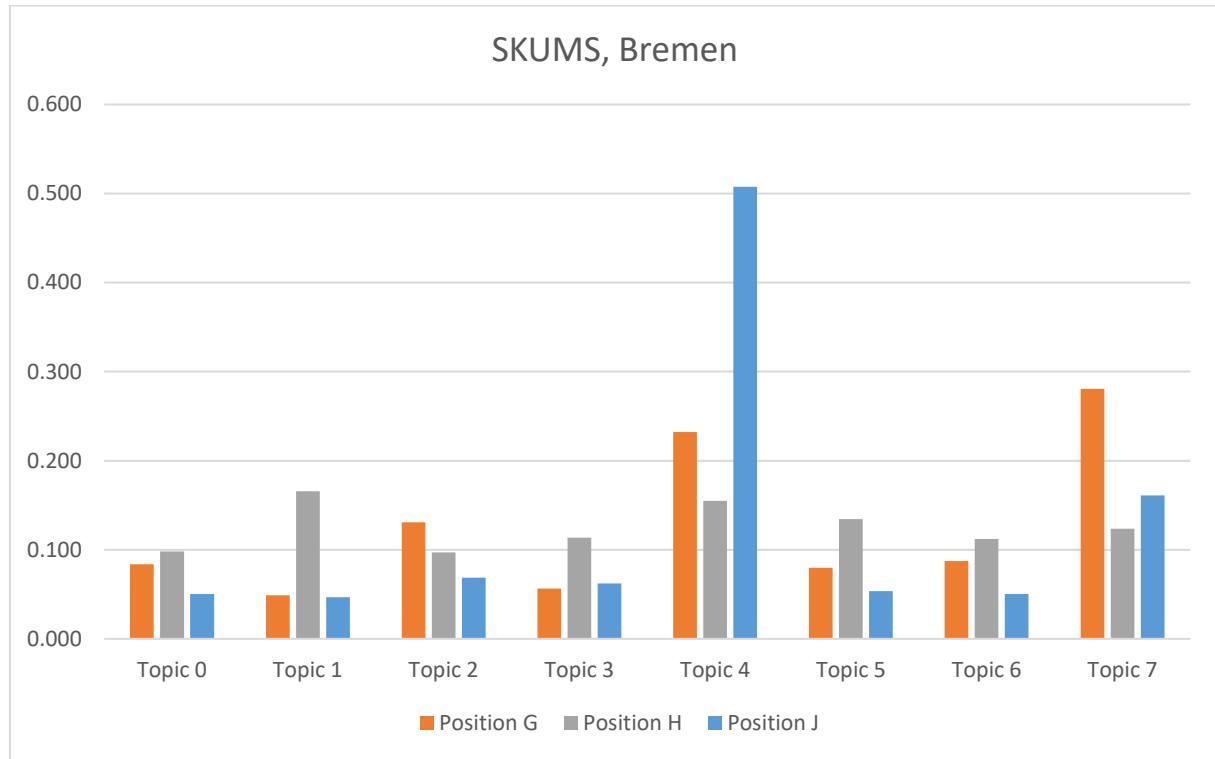


Fig. 5.19 Topic Probability Distribution of Actors in SKUMS, Bremen

The distribution of topics by three administrative officers in Bremen varied. Topic 1, topic 4, and topic 7 are distinct in different contributions. The theme of topic 1 is about the fast process of the pop-up bike lanes, topic 4 is about politics and exchanging information, while topic 7 is about measurement and planning. However, Bremen has no implementation of the bike lanes.

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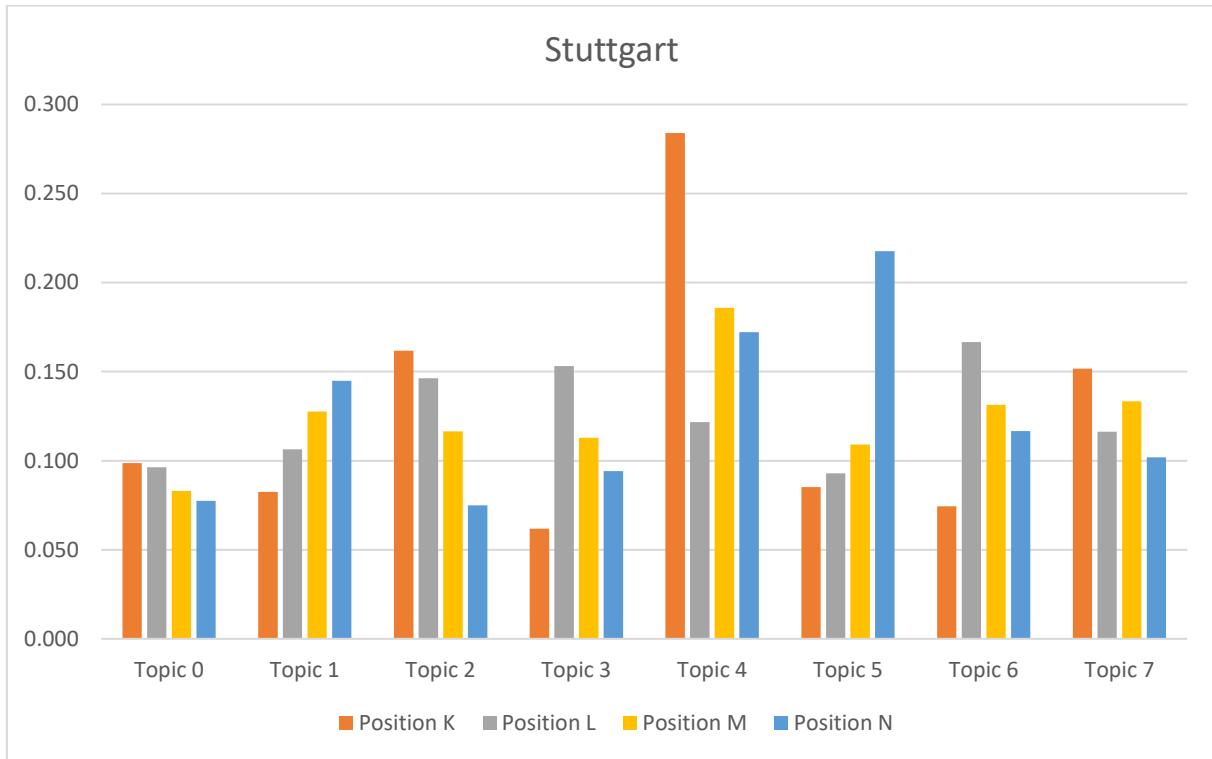


Fig. 5.20 Topic Probability Distribution of Actors in Stuttgart

Stuttgart is one of the most populated cities as well as traffic congestion in Germany. Implementation in Stuttgart is at Theodor-Heuss-Straße and Holzgartenstraße. Different contribution by different positions in Stuttgart is depicted in Fig. 5.20. While position K involves in topic 4 which is about politics and exchanging ideas of pop-up bike lanes, position N contributes much in topic 5 which is about the fast process of implementation.

6 Discussions

Pop-up bike lanes are interesting for the case study as the whole process was short, considering the time between the occurrence of the outbreak and the implementation of the policy. Although the collected data is noticeably unequal as shown in Tab. 4.2, the model did not learn that what was talked by whom or how much was being talked, but rather how words occurred together.

The four coalitions of the political stream including political parties and newspapers were discovered. This is like how ACF suggested that there should not be more than four coalitions in a policy subsystem [11] [29] [35]. Although it is possible to choose any number of topics for the model, the C_V score suggested that four topics can be interpreted well. Moreover, the cooccurrences of word choices by the model can distinguish the political parties, as every party holds a significantly high probability in a topic.

While the work of Leifeld [9] can investigate the change of coalitions with the rigid boundary, this approach offers flexible coalitions in the study. Topic modeling offers a way to determine flexible coalitions as it explores the similarity in the given data than sorts the data to the rigid frame of coalitions. It cannot work in studying longer periods to map out the movement among coalitions as the coalitions, in terms of word cooccurrence, may or may not resemble the coalitions in the past or the future. Besides, the model does not offer a pre-defined word cooccurrence, and the model cannot be directly compared.

The meaning of discourses whether they are supporting or restraining the cycling policy should be further observed in the text level of Critical Discourses Analysis. However, the study discovers that there are some discourses produced by some political parties being reproduced by the newspaper, considering that their cooccurrence of word choice is detectable. This does not mean that others were not reproduced at all but rather not detectable which could be several reasons behind such as shifting formal language into spoken language, converting written dialogue into conversational one, and rephrasing in the reproduction process as suggested by Fairclough [28]. The reproduction of discourse in society can be considered as power, and it should be studied further.

Policy core beliefs or ideologies of coalitions cannot be directly interpreted from the tokens, but the tokens rather reflect their policy core belief or ideologies in cycling policy as supporting or restraining. However, they need a deeper study of words. For example, sentiment analysis can give a sentiment, which is positive or negative of words. It will give another perspective to study what or who restrains cycling policy as discourse can mean differently from what it sounds like, similar to the work of Jensen et. al [25] that “improvement” does not always mean an improvement for non-automobile users, but many times for car drivers. Using “improvement” to describe the infrastructure change is also exercising power.

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For administrative officer's data, the discourse produced by them represents their ideologies, whether they involve more in problem or policy streams. However, most topics are not possible to be labeled as problem or policy stream. It is a debility of topic modeling that cooccurrences of which tokens cannot be specified by hand, but the model does through the observations.

Through the lens of the multi-streams policy cycle framework, the elements of the policy process according to the framework were investigated. The objects within the streams are quite clear. The pandemic is a part of the problem stream which has opened the window of opportunity and a pop-up bike lane is a policy instrument in the policy stream. National mood, according to Kruspe et. al [17] and Giese [18], was negative, such as fear and panic. However, this research aims to discover policy entrepreneurs who associate with different streams and the outcome of the policy is an interesting point given their interactions.

According to the framework [30] [31] [32] [33] [34], all streams should exist and converge at some point to the success of the policy. The case of Steglitz-Zehlendorf shows that both positions have similar probability distribution which results in no policy implementation. Similar probability distribution in the administrative officers means that they comparably acknowledge the problem and policy in the process.

On contrary, Friedrichshain-Kreuzberg has a distinct contribution in different topics comparing two positions and there are implementations on several routes in this district. Likewise, Stuttgart has differences to some degree in topic contribution and there are implementations on two routes in the city.

However, the dynamics in policy entrepreneurs do not guarantee success in cycling policy as shown in other districts. There were some differences to some degrees in Bremen and Tempelhof-Schöneberg, but pop-up bike lanes did not exist, or there was no outcome. The reasons could be that there are fewer policy entrepreneurs in all areas that were observed. Thus, the similarity and differences are too subtle to claim a solid conclusion.

Besides, the success of the policy may depend on a key actor, who is not detected by the model. The model can only provide a macroscopic scale of policy entrepreneurs of how a group of them, or a coalition, is formed.

As a policy process normally takes a long time, this research does not aim to replace the longitudinal study of the whole process and this policy process is indeed a special case by the pandemic. However, the implementation of the cycling policy process can be considered as a policy change in the framework. Therefore, this research can capture the interactions and involvements of policy entrepreneurs in the shape of ideological elements of the multi-streams policy cycle framework. It can be considered as a part of cycling policy in the long run.

6.1 Limitation

There were many limitations of the study from the method, and data.

Although topic modeling offers flexible coalitions for the study, there are several limitations such as cooccurrences of words that cannot be defined which is hard to utilize the model for the longitudinal study where discourses may change. The model also cannot estimate the sentiment of text; therefore, it is not possible to evaluate whether a coalition supports or restrain the policy.

As the interview data is quite different from the political statements and newspapers, it cannot be compared or analyzed together in a model. Moreover, as topic modeling does not allow the pre-defined cooccurrences of words, the problem and policy streams cannot be distinguished.

6.2 Future Works

Several aspects could be enhanced for example, as the cycling policy is at the district level, specific studying at the district level in several positions and actors might give more ideas about politics in the cycling policy process and be more practical for the future, especially at Friedrichshain-Kreuzberg where the pop-up bike lanes were implemented. Deeper investigation can also be insightful as a key actor, who makes this policy successful, in the area may exist.

Sentiment analysis of the discourse or other studies at the text level of critical discourse analysis can offer another angle of the study of discursive coalitions whether they reinforce or hinder the cycling policy.

7 Conclusions

Different ideologies in the cycling policy process play a different role in the policy process and they have not been studied much. Discourse practice does explain ideologies and their power in the policy process.

The ideologies in the cycling policy process were not directly discovered but the discourse production by their ideologies was. There is a difference among policy entrepreneurs regarding their discourses. Discourses can reveal the difference among coalitions as discursive coalitions. Coalitions in the political stream that advocate their belief were discovered.

While policy entrepreneurs in problem and policy stream are still vague. Their contributions are different, but the topics cannot be categorized into a stream. Friedrichshain-Kreuzberg is the area where both streams exist as topic contributions of policy entrepreneurs are different, and there are several policy implementations. While policy entrepreneurs of some areas are similar, there is not so many or no implementation.

Overall, this research is a snapshot of interaction among policy entrepreneurs in pop-up bike lanes policy as how different actors play a role in the cycling policy process is important for the success of the policy.

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List of Abbreviations

ACF	Advocacy Coalitions Framework
CDA	Critical Discourse Analysis
MSF	Multiple Streams Framework
NLP	Natural Language Processing

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Appendix I: Political Statements Collected

Date collected	Source
10.11.2020	https://www.linksfraktion.berlin/abgeordnete/kristian-ronneburg/detail/news/ausweitung-temporaerer-radfahrstreifen-bezirke-sollten-nachziehen/
10.11.2020	https://www.die-linke-bayern.de/nc/aktuell/presse/detail/news/abfuhr-fuer-die-afd-temporaere-radfahrstreifen-sind-rechtens-und-sollten-vom-bund-mitfinanziert-werde/
10.11.2020	https://www.linksfraktion.de/themen/nachrichten/detail/165-prozent-mehr-tote-im-radverkehr-in-zwei-jahren-linksfraktion-legt-sicherheitspaket-vor/
10.11.2020	https://andreaswagner.die-linke-bayern.de/nc/presse/pressemittelungen/detail/news/die-linke-fordert-eine-fahrradpraemie/
10.11.2020	https://andreaswagner.die-linke-bayern.de/nc/presse/pressemittelungen/detail/news/mdb-andreas-wagner-zum-weltfahrradtag-am-03-juni-wir-brauchen-den-ausbau-der-fahrradinfrastruktur/
10.11.2020	https://www.linksfraktion-hamburg.de/pop-up-bike-lanes-fahrrad-statt-autospur-auch-fuer-hamburg/
15.02.2021	https://www.linksfraktion-hamburg.de/abstand-halten-mehr-strassenraum-fuer-menschen-ohne-auto/
10.11.2020	https://www.dielinke-nrw.de/presse/presseerklaerungen/detail-presseerklaerungen-nrw/news/radverkehrsgesetz-darf-keine-luftnummer-werden/
10.11.2020	https://www.dielinke-boerde.de/presse/presseerklaerungen/detail/news/pm-zur-diskussion-um-pop-up-radwege/
10.11.2020	https://www.gruene-fuerth.de/2020/09/14/endlich-auch-pop-up-radwege-in-fuerth/
11.11.2020	https://www.gruene-bundestag.de/presse/pressestatements/stefan-gelhaar-zum-anhaltenden-fahrradboom
11.11.2020	https://www.gruene-bundestag.de/presse/pressemittelungen/fahrradfahrer-brauchen-mehr-platz-und-sicherheit-im-verkehr
11.11.2020	https://www.gruene-duesseldorf.de/geschuetzte-radwege-pop-up-radweg-am-rhein/
11.11.2020	https://www.gruene-muenchen.de/2020/10/26/gruene-muenchen-fordern-die-verlaengerung-der-pop-up-bikelanes/

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Date collected	Source
11.11.2020	https://www.gruene-muenchen.de/2020/08/18/pop-up-radwege-dauerhaft-einrichten-der-ba-stimmt-mit-den-gruenen-stimmen-zu/
11.11.2020	https://www.gruene-fraktion-muenchen.de/pop-up-bike-lanes-fuer-muenchen/
11.11.2020	https://www.gruene-fraktion-muenchen.de/pop-up-radwege-sollen-bleiben/
11.11.2020	https://gruene-ratsfraktion-oberhausen.de/aktuelles/aktuelles-single/article/pop_up_radwege_fuer_oberhausen/
11.11.2020	https://www.spd-muenchennordost.de/ba-13-im-november-2020/
11.11.2020	https://www.gruene-altona.de/altona-zu-fuss-und-auf-dem-fahrrad-mit-abstand-gesund-bleiben/
11.11.2020	https://gruene-eimsbuettel.de/home/news-volltext/article/gruene_moechten_den_strassenraum_waehrend_der_corona_krise_besser_aufteilen/
11.11.2020	https://www.gruene-nbg.de/2020/04/30/pop-up-bike-lanes/
11.11.2020	https://gruene.schwerte.de/index.php/pop-up-radwege-fuer-schwerte/
11.11.2020	https://gruene-fraktion.berlin/kampagne/news/
11.11.2020	https://gruene-augsburg.de/fraktion00/pressemitteilungen/pm-fraktion-single/article/gruene_und_csu_zum_beschluss_zur_erprobung_von_rad_fahrstreifen_in_der_neuburger_strasse/
11.11.2020	https://gruene-pankow.de/lokales/radverkehr/expand/768015/nc/1/dn/1/
11.11.2020	https://gruene-do.de/meldung/tx_news/gruene-setzen-sich-fuer-pup-up-bike-lanes-ein/
13.11.2020	https://www.cdu-fraktion.berlin.de/lokal_1_1_2428_Pop-up-Fiasko-von-Gruenen-Senatorin-Guenther.html
13.11.2020	https://gruene-fraktion-krefeld.de/02420-befristeter-pop-up-radweg-auf-der-st-anton-strasse-verwaltung-prueft-vorschlag-der-gruenen/
13.11.2020	https://gruene-stadtrat-regensburg.de/pop-up-bikelanes-gruene-fordern-einrichtung-von-temporaeren-fahrradspuren/
13.11.2020	https://www.gruene-fraktion-bremen.de/presse/pressemitteilungen/aus-der-corona-krise-verkehrspolitische-lehren-fuer-mehr-klimaschutz-ziehen/?L=0
13.11.2020	https://gruene-lichtenberg.de/30-04-2020-gruene-wollen-in-der-corona-krise-pop-up-radwege-fuer-lichtenberg/
13.11.2020	https://www.gruene-hessen.de/landtag/pressemitteilungen/schulweg-per-fahrrad/
13.11.2020	https://www.faktion.gruene-niedersachsen.de/presse/pressemeldungen/artikel/gruene-zeit-dass-

Appendix I: Political Statements Collected

Date collected	Source
	sich-mehr-raeder-drehen-deutlich-mehr-investitionen-in-radverkehr-noetig.html
13.11.2020	http://rad-land-pfalz.de/?p=352
13.11.2020	https://gruene-stadt-saarlouis.de/2020/08/23/zahl-der-radunfaelle-in-saarlouis-steigt-gruene-wollen-mehr-sicherheit-fuer-radfahrer/?fbclid=IwAR1mrWXTFEyg59reWMIKXXX-fvmxDZ_Zc80E3JhL114zyrLBIQVvw6YZOQg
13.11.2020	https://www.gruene-erfurt.de/2020/05/19/gruene-fordern-strategiewechsel-in-staedtischer-radverkehrspolitik/?_ga=2.200694126.1330013466.1605281257-1932382556.1605281257
13.11.2020	https://www.gruene-erfurt.de/2020/05/04/erfurter-gruene-wollen-fuss-und-radverkehr-in-corona-zeiten-mehr-raum-geben/?_ga=2.200694126.1330013466.1605281257-1932382556.1605281257
13.11.2020	https://gruene-thueringen.de/platz-fuer-kinder-schaffen-pm/
13.11.2020	https://www.gruene-luebeck.de/newssingle/article/gruene_fraktion_beantragt_einrichtung_von_pop_up_bike_lanes_in_luebeck/
23.01.2020	https://gruene-fraktion-ts.de/2020/04/01/auf-temporaeren-radfahrstreifen-sicherer-durch-corona-zeiten/
14.11.2020	https://spd-rathausmuENCHEN.de/news/spd-forciert-sichere-radwege/
14.11.2020	https://spd-rathausmuENCHEN.de/news/temporaere-radwege-in-muenchen-fdp-und-bayernpartei-verbreiten-populismus/
14.11.2020	https://spd-rathausmuENCHEN.de/news/mehr-radwege-mehr-sicherheit-mehr-dialog/
14.11.2020	https://spd-wuerzburg.de/news/wuerzburgspd-unterstuetzt-ausdrucklich-popup-radwege/
14.11.2020	http://spd-fraktion-lichtenberg.de/die-spd-fraktion-lichtenberg-spricht-sich-fuer-pop-up-radwege-in-lichtenberg-aus/
14.11.2020	https://www.spd-fraktion-dortmund.de/nachrichten/nachricht/news/spd-ratsfraktion-setzt-sich-weiter-fuer-nachhaltige-verbesserung-des-radverkehrs-ein-sofortige-einri/?tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bcontroller%5D=News&cHash=ee9df28f434565100308d514c3b56328
15.11.2020	https://spd-fraktion-leipzig.de/temporaerer-radweg-auf-der-zeppelinbruecke-ist-ein-anfang/?fbclid=IwAR1r2ERuq3Q1Yf2GTIXUAky-KaZPlhlcG9MgvZddTAibn24jq-Ux_IXYUQ8

Appendix I: Political Statements Collected

Date collected	Source
15.11.2020	https://www.spd-fraktion-hamburg.de/presse/pressemitteilungen/b/pop-up-bikelane-in-eimsbuettel-kurzfristig-zu-mehr-sicherheit-und-attraktivitaet-fuer-den-radverkehr.html
15.11.2020	https://www.spderfurt.de/meldungen/erfurter-radverkehrspolitik-protected-bike-lane-statt-pop-up-lane/
15.11.2020	https://www.fdp-bvv.de/2020/06/05/keine-pop-up-radwege-durch-die-hintertuer/
15.11.2020	https://www.fdp-flensburg.de/fdp-begruesst-mitgliedschaft-bei-rad-sh-mahnt-jedoch-zu-geduld/
16.11.2020	https://afd-fraktion-hamburg.de/2020/09/07/berliner-verwaltungsgericht-entscheidet-temporaere-radwege-rechtswidrig-ehlebracht-gruener-verkehrssenator-tjarks-muss-auf-die-bremse-treten/
16.11.2020	https://www.cdu-krefeld.de/west/aktuell/newsdetail/artikel/cdu-ratsfraktion-zum-pop-up-radweg.html
16.11.2020	https://www.spd-fraktion.net/popup-radwege-in-berlin-marzahn-hellersdorf-hinkt-hinterher.html
16.11.2020	https://www.afd-fraktion-hannover.de/276-pop-up-rad-ab
27.01.2021	https://gruene-augsburg.de/fraktion00/pressemitteilungen/pm-fraktion-single/article/eine_weitere_luecke_im_radwegenetz_soll_geschlossen_werden_gruene_und_csu_setzen_sich_fuer_radweg_in_der_froelichstrasse_ein/
22.01.2021	https://gruene-fraktion-krefeld.de/2022-gruene-begeistert-ueber-popupbikelane/
01.02.2021	http://cdu-lankwitz.de/pop-up-radwege-erst-fragen-dann-bauen/
02.02.2021	https://www.cdu-fraktion-tempelhof-schoeneberg.de/aktuelles/nach-verwaltungsgerichtsurteil-cdu-fordert-stopp-jedweder-vorbereitung/
02.02.2021	https://www.cdu-fraktion-tempelhof-schoeneberg.de/aktuelles/erst-breite-zustimmung-dann-temporaere-spielstrasse/
02.02.2021	https://www.cdu-fraktion-tempelhof-schoeneberg.de/aktuelles/nein-zu-temporaeren-fahrradspuren/
02.02.2021	https://www.cdu-fraktion-tempelhof-schoeneberg.de/aktuelles/cdu-fraktion-will-provisorischen-fussgaengerueberweg-fuer-die-kreuzung/
02.02.2021	https://www.cdu-spandau-fraktion.de/index.php?ka=1&ska=1&idn=684
02.02.2021	https://spd-leipzig.de/spd-leipzig-sofortprogramm-fuer-radverkehr-bis-herbst-umsetzen/
02.02.2021	https://csu-stadtrat-muenchen.de/keine-pop-up-bike-lanes-im-winter/
02.02.2021	https://csu-stadtrat-muenchen.de/schluss-mit-dem-wilden-radlparken-in-der-fussgaengerzone/

Appendix I: Political Statements Collected

Date collected	Source
15.02.2021	https://www.afd-fraktion.berlin/single-post/2020/06/03/antrag-auf-ausf%C3%BCr-popup-radwege
15.02.2021	https://www.afd-fraktion.berlin/single-post/2020/09/07/urteil-popup-radwege-sind-illegal
15.02.2021	https://www.afd-fraktion.berlin/single-post/2020/09/08/popup-radwege-sofort-abbauen
15.02.2021	https://www.afd-fraktion.berlin/single-post/r2g-erkl%C3%A4rt-popup-ausbau-gestoppt
15.02.2021	https://www.afd-fraktion.berlin/single-post/ovg-provoziert-verkehrskollaps
15.02.2021	https://www.spd-fraktion.net/spd-fraktion-sieht-klaerungsbedarf-in-zusammenarbeit-des-bezirksamtes-mit-der-senatsverwaltung-fuer-umwelt-verkehr-und-klima.html

Appendix II: Newspapers Collected

Appendix II: Newspapers Collected

Date collected	Source
11.11.2020	https://www.tagesspiegel.de/berlin/so-probt-kreuzberg-die-verkehrswende-die-erste-temporaere-spielstrasse-wird-eroeffnet/24875018.html
25.11.2020	https://taz.de/Gruener-Vorstoß-in-Autohilfen-Debatte/!5681123/
25.11.2020	https://taz.de/Radwege-in-Tempelhof/!5685567/
25.11.2020	https://leute.tagesspiegel.de/marzahn-hellersdorf/macher/2020/04/14/119016/gruene-fuer-pop-up-radweg-auf-allee-der-kosmonauten/?utm_source=TS-Leute&utm_medium=link&utm_campaign=leute_newsletter&fbclid=IwAR0SYVqBDyPyMfKgJczQ3a1yWIWum9VPClul0ADUlmmxsau_6PRUDfYrZsE
25.11.2020	https://taz.de/Pop-up-Radstreifen-in-Berlin/!5717138/
11.12.2020	https://www.berliner-zeitung.de/mensch-metropole/pop-up-radwege-in-berlin-duerfen-vorerst-bleiben-li.109748
26.01.2021	https://www.bild.de/regional/muenchen/muenchen-aktuell/wegen-radlwegen-pop-up-aerger-in-der-koalition-73628128.bild.html
11.12.2020	https://www.stuttgarter-zeitung.de/inhalt.popup-bike-lane-in-stuttgart-oezdemir-greift-kaufmann-nach-tweet-an.c0a53e18-2adc-484d-a2db-d5b96bb3c7f2.html
11.12.2020	https://www.tagesspiegel.de/berlin/berliner-pop-up-radwege-rechtswidrig-verkehrsverwaltung-will-beschwerde-gegen-gerichtsentscheid-einlegen/26164102.html
11.12.2020	https://www.tagesspiegel.de/berlin/nervenkrieg-bei-rot-rot-gruen-ein-jahr-vor-der-wahl gehen-spd-und-gruene-in-berlin-aufeinander-los/26182636.html
11.12.2020	https://www.tagesspiegel.de/berlin/nach-beschluss-gegen-pop-up-radwege-ist-eine-fahrradfreundliche-stadt-ueberhaupt-moeglich/26167160.html
11.12.2020	https://www.tagesspiegel.de/berlin/pop-up-radwege-und-klimapaket-der-stil-von-guenther-aehnelt-dem-einer-aktivistin/26168692.html
11.12.2020	https://www.berliner-zeitung.de/mensch-metropole/polizeigewerkschaften-schiessen-gegen-pop-up-radwege-li.105675
11.12.2020	https://leute.tagesspiegel.de/charlottenburg-wilmersdorf/macher/2020/09/11/138740/politiker-streiten-ueber-radwege/

Appendix II: Newspapers Collected

Date collected	Source
11.12.2020	https://leute.tagesspiegel.de/tempelhof-schoeneberg/macher/2020/05/05/122262/unzufriedene-gruene-warten-auf-die-pop-up-radwege/
11.12.2020	https://taz.de/Mehr-Radwege-dank-der-Coronakrise/!5684794/
14.12.2020	https://www.lvz.de/Leipzig/Lokales/Leipziger-fordern-mehr-Fahrradwege
11.12.2020	https://taz.de/Pop-up-Radwege-und-Corona/!5720924/
11.12.2020	https://www.berliner-zeitung.de/news/pop-up-radwege-afd-politiker-verklagt-senatsverwaltung-li.88413
14.12.2020	https://www.lvz.de/Leipzig/Lokales/Fahrgastschwund-bei-den-LVB-laesst-Autoverkehr-in-Leipzig-anwachsen
14.12.2020	https://www.lvz.de/Leipzig/Stadtpolitik/Radfahren-in-Leipzig-Hier-sind-Fahrradstrassen-Radwege-Tempo-30-und-Fahrradstaender-geplant
11.12.2020	https://www.berliner-zeitung.de/mensch-metropole/afd-fordert-sofortige-raeumung-der-umstrittenen-pop-up-radwege-li.103745
02.02.2021	https://www.abendzeitung-muenchen.de/muenchen/muenchner-csu-will-parkplaetze-fuer-den-radverkehr-streichen-art-684968
11.12.2020	https://taz.de/Gericht-stoppt-Pop-up-Radwege-in-Berlin/!5712633/
14.12.2020	https://www.lvz.de/Leipzig/Lokales/Jahnallee-in-Leipzig-bekommt-Radweg-auf-Zeit
14.12.2020	https://www.lvz.de/Leipzig/Lokales/ADAC-warnt-vor-Radfahrstreifen-auf-der-Leipziger-Zeppelinbruecke
27.01.2021	https://www.bild.de/regional/muenchen/muenchen-aktuell/stadtrat-muenchen-entscheidet-pop-up-radwege-kommen-weg-73638260.bild.html
14.12.2020	https://www.weser-kurier.de/bremen/bremen-stadt_artikel,-wall-wird-zur-premiumroute-mit-einbahnstrasse-_arid,1919392.html
11.12.2020	https://www.berliner-zeitung.de/news/pop-up-radwege-voraussetzungen-lagen-nicht-vor-li.103460
11.12.2020	https://taz.de/Neue-Rad-Infrastruktur-gegen-Corona/!5673510/
11.12.2020	https://www.stuttgarter-zeitung.de/inhalt.verkehr-in-stuttgart-pop-up-radweg-auf-der-theo-ist-geschichte.3f9b5472-56fa-4ee8-be80-c24ead75ab8e.html
11.12.2020	https://www.stuttgarter-zeitung.de/inhalt.experiment-in-stuttgart-viel-platz-fuer-radler.ddbaa74d-06e7-48c2-b94a-eaec8811bb4f.html
11.12.2020	https://www.tagesspiegel.de/berlin/radverkehr-um-25-prozent-gestiegen-berlin-hat-in-coronakrise-bislang-21-5-kilometer-pop-up-radwege-gebaut/26014504.html

Appendix II: Newspapers Collected

Date collected	Source
11.12.2020	https://www.stuttgarter-zeitung.de/inhalt.protest-fuer-pop-up-lane-in-stuttgart-demo-mit-poolnudel.efbda785-4c94-4ce9-813e-a274842b99e7.html
11.12.2020	https://www.stuttgarter-zeitung.de/inhalt.radverkehr-in-stuttgart-bike-lane-auf-der-theo-entfaellt.1a622e5b-5acc-48d0-8f96-c819909541d2.html
14.12.2020	https://www.stuttgarter-zeitung.de/inhalt.fahrradfahren-in-stuttgart-wie-geht-es-mit-den-bike-lanes-weiter.09fa3221-351c-48ef-a46f-e0a25dca7326.html
14.12.2020	https://www.rnd.de/mobilitaet/mobilitatswende-in-europa-die-pop-up-radwege-von-berlin-J4EPUBXFKJD57BCEL2FHGYLEJQ.html
14.12.2020	https://www.stuttgarter-zeitung.de/inhalt.radfahrstadt-werden-autostadt-bleiben-radfahrstadt-werden-autostadt-bleiben.352b6955-33b4-41e6-b4f9-c248ca8e0ef2.html
14.12.2020	https://www.stuttgarter-zeitung.de/inhalt.verkehr-in-stuttgart-welche-folgen-steigende-radlerzahlen-haben.df8c352a-4021-408b-bb52-3c6b4f05b586.html
14.12.2020	https://www.stuttgarter-zeitung.de/inhalt.selbstversuch-eine-tour-durch-stuttgart-fahrradfahren-ist-stress.83a2c407-ae58-42ba-8095-66d899248038.html
14.12.2020	https://www.stuttgarter-zeitung.de/inhalt.stuttgart-will-fahrradstadt-werden-neuer-radweg-fuehrt-durch-die-city-und-soll-dauerhaft-bleiben.a53d2bc1-432d-47a3-bd4a-367468361621.html
27.01.2021	https://www.bild.de/regional/muenchen/muenchen-aktuell/fahrradweg-dicht-autospur-weg-muenchen-macht-pop-up-bike-lanes-71584828.bild.html
14.12.2020	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-vermisches_artikel,-streit-ueber-bussgeldkatalog-geht-weiter-_arid,1939290.html
14.12.2020	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-wirtschaft_artikel,-ansturm-auf-radlaeden-fahrrad-koennte-krisengewinner-werden-_arid,1912787.html
14.12.2020	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-vermisches_artikel,-greenpeace-warnt-vor-autokollaps-in-staedten-_arid,1914085.html
14.12.2020	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-wirtschaft_artikel,-fahrradboom-ansturm-auf-radlaeden-nimmt-kein-ende-_arid,1921627.html

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Date collected	Source
14.12.2020	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-wirtschaft_artikel,-roller-rad-auto-bus-wer-in-der-krise-profitiert-_arid,1922022.html
14.12.2020	https://www.weser-kurier.de/themenwelt/auto-mobilitaet_artikel,-welche-verkehrsmittel-profitieren-von-der-krise-_arid,1922052.html
19.01.2021	https://www.sueddeutsche.de/wirtschaft/verkehr-stuttgart-dutzende-millionen-stehen-fuer-radwege-im-suedwesten-bereit-dpa.urn-newsml-dpa-com-20090101-200511-99-15210
25.01.2021	https://www.hamburg.de/pressearchiv-fhh/14626918/2020-11-15-bvm-pop-up-bikelane/
25.01.2021	https://www.hamburg.de/pressearchiv-fhh/14285590/2020-09-06-bvm-pop-up-bikelane/
25.01.2021	https://www.pressreader.com/germany/abendzeitung-munchen/20201127/281702617271713
25.01.2021	https://www.stuttgarter-zeitung.de/inhalt.mobilitaet-in-stuttgart-stadt-plant-zwei-temporaere-radfahrstreifen.04cd40cb-ec26-4de5-a3cb-041a48c6dba3.html
25.01.2021	https://www.stuttgarter-zeitung.de/inhalt.pop-up-bike-lanes-in-stuttgart-das-sagen-die-stadtraete-ueber-die-neuen-fahrradspuren.5c221acf-d213-48b7-9c0d-9636d8487489.html
27.01.2021	https://www.bild.de/regional/berlin/berlin-aktuell/in-corona-krise-entstanden-berliner-pop-up-radwege-sind-rechtswidrig-72779742.bild.html
25.01.2021	https://www.pressreader.com/germany/bietigheimer-zeitung/20200916/282398401837041
25.01.2021	https://www.pressreader.com/germany/bietigheimer-zeitung/20200916/282402696804337
25.01.2021	https://www.sueddeutsche.de/muenchen/freising/freising-radverkehr-radwege-verkehrssicherheit-fahrrad-1.5039781
26.01.2021	https://www.welt.de/regionales/berlin/article216117326/Hunderte-demonstrieren-fuer-sichere-Radwege.html
26.01.2021	https://www.berliner-zeitung.de/mensch-metropole/warum-die-pop-up-radwege-berlins-autofahrer-aufregen-li.86859
26.01.2021	https://www.sueddeutsche.de/auto/coronavirus-verkehrswende-radweg-berlin-1.4893717
26.01.2021	https://www.sueddeutsche.de/muenchen/freising/freising-radwege-kamergasse-poststrasse-1.5027985
26.01.2021	https://taz.de/Pop-up-Radwege-in-Berlin/!5716227/
26.01.2021	https://taz.de/Verbot-der-Pop-up-Radwege/!5711050/

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Date collected	Source
27.01.2021	https://www.bild.de/regional/berlin/berlin-aktuell/von-wegen-temporaer-berlins-neue-radwege-sollen-fuer-immer-bleiben-70996620.bild.html
26.01.2021	https://taz.de/Automobilclub-kritisiert-Infrastruktur/!5721404&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Archiv-Suche/!5674539&s=Pop%2Bup%2BRadweg&SuchRahmen=Print/
26.01.2021	https://taz.de/Kritik-an-temporaeren-Radstreifen/!5678529&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Temporaere-Radinfrastruktur/!5674769&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Rechts-abbiegender-Lkw-toetet-Radlerin/!5686533&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Sternfahrt-am-Sonntag-in-Berlin/!5686547&s=Pop+up+Radweg/
27.01.2021	https://www.bild.de/regional/hamburg/hamburg-aktuell/autofahrer-fluchen-radler-jubeln-pop-up-lane-in-altona-73957438.bild.html
26.01.2021	https://taz.de/Massnahmen-gegen-Raser/!5706859&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Pop-up-Bikelane-weicht-Baustelle/!5699409&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Streit-bei-Rot-Rot-Gruen-in-Berlin/!5709959&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Vorlaeufiger-Gerichtsentscheid/!5718866&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Archiv-Suche/!5716281&s=Pop%2Bup%2BRadweg&SuchRahmen=Print/
26.01.2021	https://taz.de/Pop-up-Radstreifen-in-Berlin/!5686203&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Verkehrspolitische-Vorstoesse-der-CDU/!5692419&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Fahrrad-Boom-in-Corona-Pandemie/!5694408&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Neuer-Radweg-in-Hamburg/!5694902&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Berliner-Urteil-zu-Pop-up-Radwegen/!5708251&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Radfahren-in-Berlin/!5711627&s=Pop+up+Radweg/

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Date collected	Source
27.01.2021	https://www.bild.de/regional/muenchen/muenchen-aktuell/muenchen-stau-wegen-radl-irrsinn-71974514.bild.html
26.01.2021	https://taz.de/Verkehrswende-in-Berlin/!5711959&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Archiv-Suche/!5716771&s=Pop%2Bup%2BRadweg&SuchRahmen=Print/
26.01.2021	https://taz.de/Reform-der-Strassenverkehrsordnung/!5720437&s=Pop+up+Radweg/
26.01.2021	https://taz.de/Archiv-Suche/!5723258&s=Pop%2Bup%2BRadweg&SuchRahmen=Print/
26.01.2021	https://taz.de/Konsequenzen-der-Amokfahrt-in-Trier/!5728990&s=Pop+up+Radweg/
26.01.2021	https://www.abendzeitung-muenchen.de/muenchen/bis-zu-den-isarauen-spd-fordert-einen-ost-sued-radweg-art-682558
26.01.2021	https://www.weser-kurier.de/region/die-norddeutsche_artikel,-gemeinde-investiert-46-millionen-euro-_arid,1949924.html
26.01.2021	https://www.weser-kurier.de/region/osterholzer-kreisblatt_artikel,-erste-fahrradstrasse-fuer-osterholz-_arid,1941466.html
26.01.2021	https://www.weser-kurier.de/deutschland-welt/deutschland-welt-vermischtes_artikel,-adac-und-adfc-bemaengeln-schlechte-radwege-_arid,1939251.html
26.01.2021	https://www.weser-kurier.de/region/wuemme-zeitung_artikel,-klimawandel-erwuenscht-fuer-radfahrer-_arid,1946271.html
26.01.2021	https://www.weser-kurier.de/bremen/bremen-stadt_artikel,-regierung-pumpt-millionen-in-den-radverkehr-_arid,1905177.html
26.01.2021	https://www.weser-kurier.de/region/osterholzer-kreisblatt_artikel,-kritik-am-investitionsstau-_arid,1931081.html
26.01.2021	https://www.weser-kurier.de/bremen/bremen-stadt_artikel,-wall-wird-zur-premiumroute-mit-einbahnstrasse-_arid,1919392.html
26.01.2021	https://www.weser-kurier.de/bremen/bremen-stadt_artikel,-wege-aus-der-enge-_arid,1908004.html
26.01.2021	https://www.tagesspiegel.de/berlin/unfallforscher-kritisiert-pop-up-radwege-der-radverkehr-nimmt-zu-das-risiko-auch/26236754.html
26.01.2021	https://www.tagesspiegel.de/berlin/18-prozent-mehr-fahrradfahrer-berlins-radverkehr-boomt-im-corona-jahr/26646876.html
26.01.2021	https://www.tagesspiegel.de/berlin/sternfahrt-mit-600-teilnehmern-radfahrer-demonstrieren-fuer-fahrradfreundliche-stadt/25895048.html

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Date collected	Source
26.01.2021	https://www.tagesspiegel.de/berlin/fahrraddemo-des-adfc-in-berlin-sternfahrt-fuer-sichere-radwege-gestartet-verkehrseinschraenkungen-rund-um-den-grossen-stern/25894350.html
26.01.2021	https://www.berliner-zeitung.de/mensch-metropole/pop-up-flop-li.104272
26.01.2021	https://www.welt.de/regionales/berlin/article217364122/Friedrichshain-Kreuzberg-kuendigt-weiteren-Pop-up-Radweg-an.html
26.01.2021	https://www.welt.de/regionales/berlin/article220079608/Schulze-geht-davon-aus-dass-Pop-up-Radwege-Bestand-haben.html
26.01.2021	https://www.pressreader.com/germany/hamburger-morgenpost/20201113/281655372604374
27.01.2021	https://www.bild.de/regional/berlin/berlin-aktuell/seit-der-corona-krise-in-berlin-p-l-oppens-immer-mehr-radwege-auf-71729448.bild.html
26.01.2021	https://www.berliner-zeitung.de/news/scheidender-spd-chef-mueller-fordert-von-partei-mehr-selbstbewusstsein-li.122183
26.01.2021	https://www.welt.de/regionales/hamburg/article215147164/Mobilitaetswende-in-Hamburg-Strassenraum-wird-zugunsten-des-Radverkehrs-neu-sortiert-auch-mit-Pop-Up-Radwegen.html
26.01.2021	https://www.welt.de/regionales/hamburg/article220358910/Gruener-Verkehrssenator-Der-Radverkehr-in-Hamburg-boomt.html
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/11/Wo-bleibt-mein-Radweg-Oekoloewe-startet-Petition-fuer-Pop-up-Radwege-in-Leipzig-361162
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/12/Radverbindung-Lindenau-Innenstadt-Leipzigs-Verkehrsdezernat-will-die-Pruefung-jetzt-bis-2023-verschieben-364756
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/10/Die-Leipziger-SPD-Fraktion-beantragt-ein-Sofortprogramm-fuer-den-Leipziger-Radverkehr-352715
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/09/Das-fehlende-Stueck-Radweg-Greenpeace-Aktive-organisieren-am-19-September-eine-Pop-up-Bikelane-auf-der-Karl-Heine-Strasse-349633
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/07/SPD-Kreisverband-Bis-Herbst-braucht-Leipzig-mehr-Popup-Bikelanes-und-ein-Stueck-Radweg-in-Connewitz-muss-abgepolllert-werden-339689
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/07/Fuer-den-Oekoloewen-ist klar-Der-Radweg-in-der-Karl-Heine-Strasse-gehört-auf-die-Fahrbahn-341737

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Date collected	Source
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/07/Leipzigs-Verkehrs-und-Tiefbauamt-arbeitet-derzeit-an-acht-Projekten-zur-Radwegmarkierung-339260
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/07/Aenderungsantrag-der-Gruenen-Stimmt-der-Stadtrat-der-Markierung-von-14-weiteren-Radwegen-im-Leipziger-Netz-heute-zu-339145
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/05/Radweg-am-Connewitzer-Kreuz-Die-Litfasssaule-muss-weg-und-an-einer-schrittweisen-Loesung-wird-gearbeitet-333675
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/05/Jetzt-wird-auch-in-der-Harkortstrasse-fuer-einen-sicheren-Radweg-demonstriert-333163
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/05/Auch-wegen-Corona-Zeppelinbruecke-bekommt-jetzt-einen-temporaeren-Radweg-332652
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/05/Greenpeace-Leipzig-richtet-am-Samstag-einen-Pop-up-Radweg-am-Voelkerschlachdenkmal-ein-332546
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/04/Verwaltung-will-jetzt-ausklamuesern-was-mit-dem-verkorksten-Radweg-vorm-Rewe-in-Connewitz-passieren-soll-327874
26.01.2021	https://www.l-iz.de/politik/brennpunkt/2020/04/Oekoloewe-fordert-Radfahrstreifen-am-Connewitzer-Kreuz-jetzt-326182
26.01.2021	https://www.l-iz.de/wirtschaft/mobilitaet/2020/03/ADFC-Sachsen-fordert-provisorische-Radwege-auf-Hauptverkehrsachsen-323633
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.coronakrise-umwelthilfe-fordert-provisorische-fahrradstrassen-in-stuttgart.1b52e091-4a14-4e75-9b34-733ae33256a1.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.mobilitaet-in-stuttgart-weilimdorf-der-fahrrad-und-fussverkehr-nimmt-zu.bbc8d408-db48-4433-83b2-c89f135404eb.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.esslingen-auf-dem-fahrradsattel-durch-die-krise.747c08ec-550c-4b07-8949-522f7eac71a0.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.esslingen-ostfeldern-die-filder-auffahrt-wird-fuer-radler-weit-komfortabler.f76b6d6b-59b0-4957-b479-cee1f2ba79ff.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.coronavirus-auf-den-fildern-radler-fordern-besseren-schutz-vor-ansteckung.a2b0aa5f-42c5-4728-b525-c4ee7e0a684e.html

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Date collected	Source
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.luftreinhaltung-herrenbergs-umbau-zur-modellstadt-beginnt.65706aa7-65b9-4689-8ad3-07ffffaa6e032.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.radfahren-in-stuttgart-radfahrer-profitieren-von-coronakrise.fd496694-e4ee-41d7-9e5b-245fbb0a5fdb.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.moensheim-in-der-corona-krise-das-hat-auch-der-buergermeister-nie-erlebt.a09f5948-3ab8-4199-8aa2-29f61b36854a.html
26.01.2021	https://www.stuttgarter-zeitung.de/inhalt.fahrradfahren-in-deutschland-prima-fahrrad-klima-mitmachen-beim-staedte-test-des-adfc.b491a977-865b-4765-a52b-2b2a16c09cb0.html
02.02.2021	https://www.abendzeitung-muenchen.de/muenchen/muenchen-sind-die-pop-up-radwege-illegal-art-665065
02.02.2021	https://www.abendzeitung-muenchen.de/muenchen/pop-up-radwege-polizei-zieht-zwischenbilanz-art-554194

Appendix III: Interview Questions

(Questions are not allowed to be published.)

Appendix IV: Stop-words

Primary Stop-words

The original version was done by Marco Götze, Steffen Geyer which can be accessed here
<https://solariz.de/de/downloads/6/german-enhanced-stopwords.htm>

This is the modified one. Some stopwords are taken out as it has meaning.

ab, aber, alle, allein, allem, allen, aller, allerdings, allerlei, alles, allzu, als, alsbald, also, am, an, and, ander, andere, anderem, anderen, anderer, andererseits, anderes, anderm, andern, andernfalls, anders, anstatt, auch, auf, aus, ausser, ausserdem, außer, außerdem, außerhalb, bald, bei, beide, beiden, beiderlei, beides, beim, beinahe, bereits, besonders, bevor, bezüglich, bin, bis, bisher, bislang, bist, bloß, bsp., bzw, ca, ca., da, dabei, dadurch, dafür, dagegen, daher, dahin, damals, damit, danach, daneben, dann, daran, darauf, , daraus, darin, darum, darunter, darüber, darüberhinaus, das, dass, dasselbe, davon, davor, dazu, daß, dein, deine, deinem, deinen, deiner, deines, dem, demnach, demselben, den, denen. denn, dennoch, denselben, der, derart, derartig, derem, deren, derer, derjenige, derjenigen, derselbe, derselben, derzeit, des, deshalb, desselben, dessen, desto, deswegen, dich, die, diejenige, dies, diese, dieselbe, dieselben, diesem, diesen, dieser, dieses, diesseits, dir, doch, dort, dorther, dorthin, drauf, drin, drunter, drüber, du, dunklen, durch, durchaus, eben, ebenfalls, ebenso, eher, eigenen, eigenes, eigentlich, ein, eine, einem, einen, einer, einerseits, eines, einfach, einig, einige, einigem, einigen, einiger, einigermaßen, einiges, einmal, eins, einst, einstmals, einzig, entsprechend, entweder, er, erst, es, etc, etliche, etwa, etwas, euch, euer, eure, eurem, euren, eurer, eures, falls, fast, ferner, folglich, fuer, für, ganz, ganze, ganzem, ganzen, ganzer, ganzes, gar, gegen, gemäss, ggf, gleich, gleichwohl, gleichzeitig, glücklicherweise, gänzlich, hab, habe, haben, haette, hast, hat, hatte, hatten, hattest, hattet, heraus, herein, hier, hinter, hiermit, hin, hinein, hinten, hinter, hinterher, http, hätt, hätte, hätten, höchstens, ich, igitt, ihm, ihn, ihnen, ihr, ihre, ihrem, ihren, ihrer, ihres, im, immer, immerhin, in, indem, indessen, infolge, innen, innerhalb, ins, insofern, inzwischen, irgend, irgendeine, irgendwas, irgendwen, irgendwer, irgendwie, irgendwo, ist, ja, je, jed, jede, jedem, jeden, jedenfalls, jeder, jederlei, jedes, jedoch, jemand, jene, jenem, jenen, jener, jenes, jenseits, jetzt, jährig, jährige, jährigen, jähriges, kam, kann, kannst, kaum, kein, keine, keinem, keinen, keiner, keinerlei, keines, keineswegs, klar, klare, klaren, klares, klein, kleinen, kleiner, kleines, koennen, koennt, koennte, koennten, komme, kommen, kommt, konkret, konkrete, konkreten, konkreter, konkretes, können, könnt, künftig, leider, machen, man, manche, manchem, manchen, mancher, mancherorts, manches, manchmal, mehr, mehrere, mein, meine, meinem, meinen, meiner, meines, mich, mir, mit, mithin, muessen, muesst, muesste, muss, musst, musste, mussten, muß, mußt, müssen, müsste, müssten, müßt, müßte, nach, nachdem, nachher, nachhinein, nahm, natürlich, neben, nebenan, nehmen, nein, nicht, nichts, nie, niemals, niemand, nirgends, nirgendwo, noch, nun, nur, nächste, nämlich, nötigenfalls, ob, oben, oberhalb, obgleich, obschon, obwohl, oder, oft, per, plötzlich, schließlich, schon, sehr, sehrwohl, seid, sein, seine, seinem, seinen, seiner, seines, seit, seitdem, seither, selber, selbst, sich, sicherlich, sie, sind, so, sobald, sodass, sodaß, soeben, sofern, sofort, sogar,

Appendix IV: Stop-words

solange, solch, solche, solchem, solchen, solcher, solches, soll, sollen, sollst, sollt, sollte, sollten, solltest, somit, sondern, sonst, sonstwo, sooft, soviel, soweit, sowie, sowohl, tatsächlich, tatsächlichen, tatsächlicher, tatsächliches, trotzdem, ueber, um, umso, unbedingt, und, unmöglich, unmögliche, unmöglichen, unmöglicher, uns, unser, unsere, unserem, unseren, unserer, unseres, unter, usw, viel, viele, vielen, vieler, vieles, vielleicht, vielmals, vom, von, vor, voran, vorher, vorüber, völlig, wann, war, waren, warst, warum, was, weder, weil, weiter, weitere, weiterem, weiteren, weiterer, weiteres, weiterhin, weiß, welche, welchem, welchen, welcher, welches, wem, wen, wenig, wenige, weniger, wenigstens, wenn, wenngleich, wer, werde, werden, werdet, weshalb, wessen, wichtig, wie, wieder, wieso, wieviel, wiewohl, will, willst, wir, wird, wirklich, wirst, wo, wodurch, wogegen, woher, wohin, wohingegen, wohl, wohlweislich, womit, woraufhin, woraus, worin, wurde, wurden, während, währenddessen, wär, wäre, wären, würde, würden, z.B., zB, zahlreich, zeitweise, zu, zudem, zuerst, zufolge, zugleich, zuletzt, zum, zumal, zur, zurück, zusammen, zuviel, zwar, zwischen, ähnlich, über, überall, überallhin, überdies, übermorgen, übrig, übrigens,

Political Statements and Newspaper Corpus

innen, herr, mdb, schon, beid, eben, aufs, rund, jedoch, mögen, jed, dürfen, beispiel, beispielsweise, zusätzlich, inbesondere, aufgrund, genannt, sogenannt, natürlich, nächst, ganz, insgesamt, letzt, zusätzliche, überwiegend, quasi, darüber, hinaus, davon, anfang, ende, heute, jahr, Woche, letzte, erst, mal, ernstlich, vergangen, zudem, monat, sowie, endlich, wegen, müssten, tag, datum, münchen, berlin, berliner, stuttgart, leipzig, hamburg, bayern, januar, februar, märz, "april, mai, juni, juli, august, september, oktober, november, dezember, afd, grün, grüne, grüner, grünen, csu, cdu, spd, fdp, wollen, sagen, fraktion, leipziger, gabelsbergerstraße, theresienstraße, elisenstraße, zweibrückenstraße, hauptstraße, nebenstraße, holstenstraße, einbahnstraße, kantstraße, holzgartenstraße, rödelstraße, bolzstraße, scheffelstraße, maßnahme, pandemie, corona, radweg, temporär, radfahrstreifen, bikelane, fahrradstraße, radfahr, radstreifen, radinfrastruktur, sprecher

Interview Transcript of Administrative Officers Corpus

innen, herr, mdb, schon, beid, eben, aufs, rund, jedoch, mögen, jed, dürfen, beispiel, beispielsweise, zusätzlich, inbesondere, aufgrund, genannt, sogenannt, natürlich, nächst, ganz, insgesamt, letzt, zusätzliche, überwiegend, quasi, darüber, hinaus, davon, anfang, ende, heute, jahr, Woche, letzte, erst, mal, ernstlich, vergangen, zudem, monat, sowie, endlich, wegen, müssten, tag, datum, münchen, berlin, berliner, stuttgart, leipzig, hamburg, bayern, januar, februar, märz, "april, mai, juni, juli, august, september, oktober, november, dezember, afd, grün, grüne, grüner, grünen, csu, cdu, spd, fdp, wollen, sagen, fraktion, leipziger, gabelsbergerstraße, theresienstraße, elisenstraße, zweibrückenstraße, hauptstraße, nebenstraße, holstenstraße, einbahnstraße, kantstraße, holzgartenstraße, rödelstraße, bolzstraße, scheffelstraße, ding, unverst, sag, genau, relativ, glauben, leute, heißen, kriegen, groß, sache, gucken, sehen, finden

Appendix V: Bigram List

Political Statements and Newspaper Corpus

('käthe', 'kollwitz')	('charlottenburg', 'wilmersdorf')	('pop-up', 'bikelane')
('dieter', 'reiter')	('holger', 'mann')	('cdu', 'fraktion')
('dorothee', 'dubrau')	('halleschen', 'ufer')	('spd', 'fraktion')
('max', 'brauer')	('osterholz', 'scharmbeck')	('csu', 'fraktion')
('ranstädter', 'steinweg')	('tempelhof', 'schöneberg')	('bornaischen', 'straße')
('florian', 'schmidt')	('theodor', 'heuss')	('landshuter', 'straße')
('maike', 'schaefner')	('karl', 'heine')	('prager', 'straße')
('marzahn', 'hellersdorf')	('karl', 'liebknecht')	('lichtenberger', 'straße')
('new', 'york')	('frank', 'scholtysiek')	('liebknecht', 'straße')
('steglitz', 'zehlendorf')	('felix', 'weisbrich')	('neuburger', 'straße')
('alexander', 'kotz')	('regine', 'günther')	('fraktion', 'linke')
('ralf', 'olschewski')	('andrea', 'wagner')	('pop-up', 'bike')
('raghnild', 'sørensen')	('brauer', 'allee')	('heuss', 'straße')
('arno', 'nitzsche')	('schöneberger', 'ufer')	('heine', 'straße')
('oliver', 'friederici')	('tempelhofer', 'damm')	('nitzsche', 'straße')
('anjes', 'tjarks')	('frankfurter', 'allee')	('petersburger', 'straße')
('marc', 'vallendar')	('kottbusser', 'damm')	('anton', 'straße')
('monika', 'herrmann')	('michael', 'müller')	('erdinger', 'straße')
('thijs', 'lucas')	('schönhauser', 'allee')	('rosenheimer', 'straße')
('changing', 'cities')	('andrea', 'scheuer')	('temporär', 'radfahrstreifen')
('richard', 'lehmann')	('bike', 'lane')	('temporär', 'radstreifen')
('stefan', 'gelhaar')	('friedrichshain', 'kreuzberg')	('lehmann', 'straße')
('baden', 'württemberg')	('lindenau', 'innenstadt')	('temporär', 'radspuren')
('connewitzer', 'kreuz')	('rot', 'rot')	('pop-up', 'radweg')
('baden', 'württembergischen')	('rot', 'grün')	('fraktion', 'grüne')
('lisa', 'feitsch')	('temporär', 'spielstraße')	('temporär', 'radweg')

Interview Transcript of Administrative Officers Corpus

('cottbusser', 'damm')	('pop-up', 'radweg')
('danziger', 'straße')	('temporär', 'maßnahme')
('temporär', 'radverkehrsanlagen')	('temporär', 'radweg')

Declaration concerning the Master's Thesis

I hereby confirm that the presented thesis work has been done independently and using only the sources and resources as are listed. This thesis has not previously been submitted elsewhere for purposes of assessment.

Munich, June 23rd, 2021

Nunnapas Saereeporncharenkul