Debates on European Integration in the Finnish Parliament (*Eduskunta*) 1990-2020

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Abstract

In this article I analyse parliamentary debates of the Finnish Parliament (*Eduskunta*) on European integration from 1990 to 2020. Finland joined the European Union (EU) in 1995, but Finland's integration history dates back to the late 1950s and early 1960s. In the turbulent years following the end of the Cold War and the collapse of the Soviet Union in the early 1990s, European integration rose higher on the Finnish political agenda.

The data used in this article consist of a machine-readable database of plenary protocols of the Finnish Parliament. The main database covers the whole lifespan of the modern Finnish Parliament since 1906. The dataset used for the analysis contains all plenary speeches with references to "Europe", "European" and "Europeanism" (N=25,674), together with adequate metadata. The core analysis focuses on six time windows, each with a span of three years. These focus widows are linked to nationally important key European events.

Methodologically, the article is rooted in Exploratory Data Analysis (EDA) and applies different text mining tools to explore, analyse and visualise how members of the Finnish *Eduskunta* politicise and debate European issues. The analysis is carried out in three steps. First, I use traditional term-based text mining methods to explore the vocabulary used in the debate, both across time and by parliamentary faction. In the second step, I use tf-idf analysis to explore the vocabulary differentiating parliamentary factions. The analysis is rounded out in the third step by the application of Text Network Analysis (TNA). I apply TNA to explore and visualise topics in the collection of plenary speeches and, thus, to evidence the power and usefulness of this novel method as a complement to other topic modelling methods.

Overall, the results presented in this article find strong support when critically reflected against findings from previous studies. The results also significantly improve our knowledge and understanding of national parliamentary debates on European integration. Further, the article is encouraging when it comes to the application of computational methods and tools on large corpora of unstructured political texts.

Keywords European integration, Finnish Parliament, Plenary discussions, Exploratory Data Analysis, Text Network Analysis

1. Introduction

Parliamentary debates are one major policy platform where spoken language plays a central role. In parliamentary debates, members of parliament (MPs) take up topical political questions and issues and use rhetorical means to express their opinions. Plenary discussions fulfil, as Auel and Raunio (2014, 13) point out, an important communicative function in informing "citizens about complex political issues." That a particular issue is raised in parliamentary debate makes it the subject of political struggles. This act of politicisation recognises the potential politicality of any factual issue,

i.e. an action marking the issue as political by detecting its political potential and thus expanding the presence of the political and presenting a particular representation of reality (Koller 2014, 164).

In principle, no issue is essentially, let alone automatically, political, but at the same time every issue is *potentially* political. Along with politicisation, the struggle for power over the state of politics by the use of language, is also present in the parliamentary discussions (Palonen 2007, 42, 62–63, 65–66.) Consequently, parliamentary debates are debates for and against, where MPs seek a majority for their own position by using rhetorical means. From this perspective, parliamentary discussions reveal similarities and differences in arguments, priorities and goals. Further, the outcome of such a struggle also demonstrates what is possible and achievable under the current political circumstances (Palonen 2005, 144–145).

Speeches in plenary sessions of a parliament are a key venue for the exertion of the parliament's representative power. They convey messages to voters, supporters, interest groups, other politicians and, more broadly, the general public. In plenary debates, MPs seek to promote factual issues, underline their own positions, communicate their achievements and differentiate themselves from politicians from other parties (Slapin & Proksch 2010; Alemán & Micozzi 2021). Each MP is well aware of the fact that everything she says in a plenary debate can resonate among the wider electorate (Rauh 2015, 119). Further, parliamentary debates are a central part of the opinion-formation and decision-making processes of the representative system, but these debates also shape political language and political culture. In modern, contemporary democratic parliaments, plenary debates reflect the struggle for the thematisation and the salience of different societal and political issues and questions (Palonen 2012, 245).

Pasi Ihalainen and Kari Palonen (2009, 17) call for an examination of the speeches commonly used in parliaments from the point of view of conceptual change and innovation in the way those concepts are used. The renewal of the parliamentary agenda and its concepts is an essential element in parliamentary activity. Hence, their examination is an important part of the conceptual history of politics. Conceptual changes should therefore be assessed as rhetorical acts (Palonen 1999, 46). This is because the vast majority of political acts take place rhetorically in the first instance, with political perceptions and practices then structured based on linguistically and rhetorically formed concepts.

This article focuses on parliamentary debates of the Finnish Parliament (*Eduskunta*) on European integration from 1990 to 2020. Finland joined the European Union (EU) in 1995, but Finland's integration history dates back to the late 1950s and early 1960s. In the turbulent years following the end of the Cold War and the collapse of the Soviet Union in the early 1990s, European integration rose higher on the Finnish political agenda. Since then, issues related to European integration have significantly shaped Finnish politics. Against this background, the article expects the plenary debates to offer interesting insights into continuity and change in the topics of political debates on European integration in Finland.

For a long time, the role of national parliaments in European integration was seen as marginal, since the classical task of national parliaments was viewed as being to provide a forum for the debate between the governmental parties and the parliamentary opposition, as well as to scrutinise the policies implemented by the executive at the national level (Wendler 2011; Auel & Raunio 2014). During the past decade, however, scholars have started to show increased interest in the transnational nature of the national parliaments of the EU member states. This shift is accounted for by the growing internationalisation in general, and the strengthened Europeanisation in particular, both trends increasing the role of European affairs in national representation (Gattermann et al. 2016; Winzen et al. 2018; Kinski & Crum 2020). Wendler (2013) identifies four thematic segments underlying most of the parliamentary debates on European integration: 1) policy construction issues tackling the transfer of political competencies to the EU and the construction of a supranational polity, 2) governance issues referring to supranational decisions and addressing the content of supranational, EU-level decisions, 3) questions related to the adaptation of the democratic institutions and mechanisms of the nation state to the process of European integration, and 4) responses of national decision-makers to "the domestic implementation of EU rules and the adaptation of domestic policies to the requirements of European integration" (p. 805).

From a general perspective, the results presented in this article evidence a rather strong presence of European integration affairs in the Finnish parliamentary debates. Hence, first, the results confirm that parliamentary debates play an important role in the politicisation of European issues at the national level. Politicisation is here understood as a process that involves "the greater salience, polarization of and mobilization around EU affairs" (Kröger & Bellamy 2016, 142). This holds true especially for nationally important and influential moments of European integration, such as, in the Finnish case, the joining of the EU in 1995. Second, the results also give support to the existence of the so-called GAL-TAN (green-alternative-libertarian/ traditional-authoritarian-nationalist) polarisation among the Finnish parliamentary factions as regards European integration issues. Such a pattern is typical for party systems, where parliamentary parties are "divided between ideologically moderate and relatively EU-friendly and more Euro-sceptic and ideologically more extreme parties" (Wendler 2013, 815), and "members of parliament from culturally conservative, nationalist parties are less likely to express a positive position and to use a debordering frame on enlargement" (Bélanger & Schimmelfennig 2021, 421). Third, the vocabulary analysis confirms that different parties take up different issues depending on their ideological and programmatic setting. There is at least partial support for the thesis presented by Hurrelmann et al. (2020) stating that an MP's party affiliation strongly affects not only what topics are taken up, but especially how they are framed in parliamentary debates. And finally, the results of the cluster analysis are quite well in line with studies on the Europeanisation aspect of national parliamentary debates on European integration, where Europeanisation refers to the impact of European integration on political parties and domestic affairs, as well as on national policies and polity (Tanıyıcı 2010, 182; de Wilde 2011, 686; Kinski 2018). The results, however, do not evidence a undiluded increase in pro-EU representation, nor do they support the claim that Finnish parliamentary representation was directed against the EU. The results merely bring up evidence that European integration has had a rather strong, Europeanising impact on Finnish parliamentary debates.

Overall, this article understands itself as a contribution to the growing domain of digital parliamentary studies. Rooted in this self-understanding, the focus of this article is on the application of digital research methods and tools of distant reading[2] and Exploratory Data Analysis (EDA) on a corpus of digitised, machine-readable plenary documents of the Finnish Parliament. Consequently, my article is first and foremost a methodological contribution and seeks to exemplify how selected digital methods can be applied to a large dataset in order to obtain scientifically interesting and relevant results. The possibilities and advantages of distant reading are attracting attention and gaining in importance for the study of parliamentary speeches – a development strongly supported by the continuous improvement in the availability of relevant materials in machine-readable form. For example, a recent article by Deborah Kilroy (2021) illustrates these possibilities by analysing speeches in the early 17th-century English Parliament (*Journal of the House of Commons*) in light of speakers' social background variables and biographies. Further, Zoltan Majdik (2019) looks at congressional speech materials to study semantic contexts as well as the rhetorical expressions used. In recent years, a growing number of studies have explored contemporary plenary debates of different national parliaments by applying (mostly) computational text mining techniques to digitised parliamentary documents. Due to the limited space available, this article cannot present a comprehensive overview of such studies, but I can pick out some studies I consider relevant to a proper understanding of how this field of research has developed during past years (Rauh 2015; Diwersy et al. 2018; Magnusson et al. 2018; Tiaynen-Qadir et al. 2019; Wang et al. 2020; Edlund et al. 2021). I also strongly encourage the reader to visit the SemanticScholar portal (https://www.semanticscholar.org/) to browse a growing database of scientific literature on digital studies, among other topics.

The structure of the article is as follows. The first section introduces the data and methods used in the analysis. The second section presents and critically discusses the main results of the analysis. The article is rounded off with concluding remarks.

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[2] "Distant reading", originally developed in literature studies, refers to a macroscopic research design and workflow for the study of large-to-huge collections of data without reading each single document, but instead by exploring general characteristics, structures, and changes in time and space. (See further, Underwood 2017.)

2. Data and Methods

The primary sources used in this article consist of selected plenary minutes of the Finnish Parliament from 1990 to 2020. From the perspective of digital research, the original sources form a mixed set of material combining digitised materials and born-digital materials. Since 2015, plenary documents of the Finnish Parliament have been made available in digital form. Older plenary documents covering the years from 1906 to 2014 have been digitised and made available as PDF documents on the website of the Finnish Parliament.

These digitised documents are, however, of rather low quality and, being unstructured, are ill-suited for digital analysis. As a part of the "Semantic Parliaments" (SEMPARL) research consortium project, the digital plenary documents of the Finnish Parliament were structured and curated into a machine-readable XML database. This process was carried out by one of the consortium members, the Semantic Computing Research Group (SeCo, https://seco.cs.aalto.fi/) at Aalto University in Espoo, Finland. SeCo was also responsible for the quality assurance of the database, mostly consisting of controlling for OCR errors from the digitisation process such as misidentified characters or words. The XML dataset follows the Parla-CLARIN standard, as this is mostly used in similar international projects (see https://clarin-eric.github.io/parla-clarin/). All plenary sessions of the same session of the Parliament are included in one file. Each plenary speech contains the full speech text, accompanied, for example, by the politician's name, possible roles (speaker/deputy speaker, minister, president, etc.) and the parliamentary group of the speaker. (For a technical description of the data and its ontology, see Sinikallio et al. 2021)

For the analysis presented in this article, the full dataset was created and processed in three steps. First, I separated out only those speeches that were given between 1990 and 2020. In the second step, records for plenary speeches containing at least one of the following key terms were selected: 1) "Eurooppa" (Europe), 2) "eurooppalainen" (European), or 3) "eurooppalaisuus" (Europeanism). The selection criteria were defined so that all declension forms were also captured. After these two steps, the dataset consisted of 25,674 plenary speeches. This dataset was imported into RStudio, an integrated environment for the statistical package R, for further analysis. In the third step, I used the package 'udpipe' to lemmatise and part-of-speech (POS) tag the plenary speeches. In total, this dataset for 1990–2020 has 13,432,742 words (tokens) and 332,509 unique lemmata. On average, one plenary speech contains 523 words (sd=632), the longest having 37,324 words, the shortest only 5 words.

As noted in the introduction, the analytical framework applied in this article is rooted in EDA. To be exact, EDA is not a method or a theory, but rather an approach to *explore* different ideas that seem relevant to a researcher. The term EDA was introduced by John Tukey (1977) and "encompasses a collection of techniques for identifying the main characteristics of a […] dataset, about which one may initially know nothing" (York 2017, 462). Among scholars in the digital humanities and computational social sciences, EDA is enjoying a growing popularity as a toolbox with which to extract meaningful knowledge from so-called "big data", i.e. massive amounts of data (Altinigneli et al. 2020). To provide a limited overview, in recent years EDA has been used to gain a better understanding of large bibliographic datasets covering digitised cultural collections (York 2017; Organisciak et al. 2022), to analyse political speeches (Lowry & Naser 2010; Elo 2021), and to explore political communication on Twitter (Lynn et al. 2020; Casero-Ripollés 2021).

In order to explore differences in the use of language between different factions of the Finnish Parliament, I apply a admittedly unconventional text mining technique to measure how important a concept is to a faction in the collection of parliamentary minutes. This technique is called *term frequency, inverse document frequency* (tf-idf) analysis. The core idea of this technique is to decrease the weight of commonly used words, i.e. words frequently used in the entire collection, and to increase the weight for words used erratically. In the context of this article, the tf-idf analysis is used to explore and extract knowledge about words typical for each faction. The expectation bound up with this technique is that the exploration of faction-typical vocabulary can improve our knowledge about the main topics a faction has taken up in the parliamentary debates. This, in turn, connects this article

with previous studies focusing on how a party's ideological position influences its rhetorical approach in parliamentary debates on European integration.

The analysis is rounded off with a rather experimental application of Text Network Analysis (TNA) as a complementary, alternative method to topic modelling. TNA as a method is a spin-off of Social Network Analysis (SNA), defining a network as a set of dots (nodes, vertices) and connecting lines (edges) between nodes (for a good introduction to SNA, see, e.g., Prell 2012; Scott 2013). TNA was originally introduced by Paranyushkin (2011), who describes TNA as a method to explore "repetitive patterns derived from the text's structure, using their connectivity and the intensity of interactions between them as the only criteria for their belonging together" (p. 5). Shim et al. (2015, 58), in turn, summarise the method by stating that it seeks "to identify salient words and concepts in order to extract underlying meanings and frames from the structure of concept networks." Hence, although TNA is a non-linear approach transforming – or reconstructing – texts into a network of words, it at the same time respects and keeps the original structure of the texts. This is also the biggest advantage of TNA compared to other common methods of text mining like co-occurrence analysis (Stuart & Botella 2009; Lee et al. 2010; Brier & Hopp 2011; Yang et al. 2014) or Latent Dirichlet Allocation (LDA, see Blei et al. 2003). The analytical focus of TNA lies in the network structure (nodes, edges) and is based on the assumption that both the units selected for the analysis (here: words) and the connections between these (here: usage within the same word window) are significant when it comes to understanding and explaining the larger phenomenon the network is connected to (here: topics taken up in plenary debates on European integration). Consequently, the main purpose of using TNA is to elucidate structural aspects from the text corpus neglected or left unidentified by other research methods or tools (Morrissey 2015).
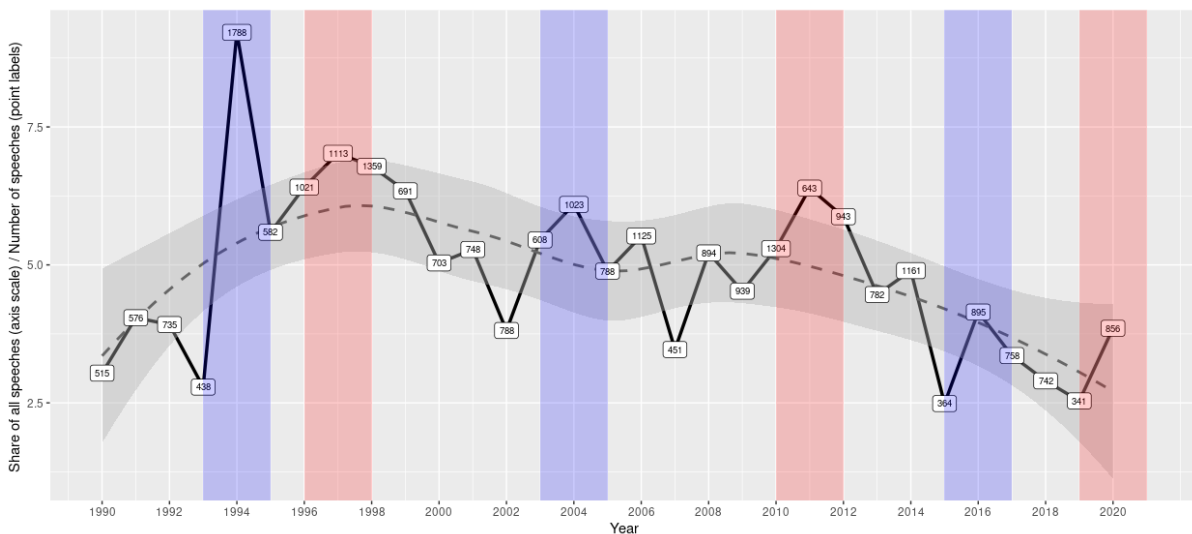
3. Results

Figure 1: Intensity of plenary debates on European integration 1990—2020 (focus time periods marked with coloured rectangles).

Following the very idea of an EDA-guided research process, I start my analysis by exploring changes in the intensity of plenary debates of the Finnish parliament on European integration in order to develop ideas on how to further approach the data. This exploration results in six (6) peak years characterised by a clear increase in the number of plenary speeches (compared to the year before) and creating for each peak year a three-year time window covering the preceding, the peak, and the subsequent year: 1) 1993–1995, 2) 1996–1998, 3) 2003–2005, 4) 2010–2012, 5) 2015–2017, and 6) 2019–2020[3]. In Figure 1, these focus periods are marked with rectangular areas in blue and red. The

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[3] The last time window covers only two (2) years, because the dataset ends with the year 2020.

reader can easily capture the idea of these focus time periods, all of them being clearly linked with an apparent increase in the number of plenary speeches on European issues.

Further, a closer look at the historical context behind these peak years evidences a rather clear linkage to remarkable political events or turning points in either Finnish integration history or in European politics. Accordingly, the first peak year (1994) is the year preceding Finland's accession to full membership in the EU. A national referendum on whether Finland should join the EU was organised on 16 October, 1994, in which 56.9% of the voters voted for the membership (for a good overview, see Aunesluoma 2021). In the so-called "filibuster debate" in the Finnish Parliament in November 1994, MPs critical of or opposed to Finland's EU membership succeeded in postponing the plenary vote so that it was scheduled to be held after the plenary vote in the Swedish Parliament on Sweden's EU membership. As the Swedish Parliament voted in favour of the membership, the relative strength of the parliamentary factions in the Finnish Parliament remained unaffected and the Finnish Parliament approved Finland's EU membership in its plenary vote later in November 1994.

The other peak years are linked to important milestones or events concerning the EU. The second time window, 1996–1998, falls in the last stage in the establishment of the European single currency (euro). The third focus period, from 2003 to 2005, seems to be linked with the Convention on the Future of Europe on the one hand, and with the terror attacks in Madrid (2004) and London (2005) on the other. The convention had started its work in 2002 and presented its draft for the European Constitution in the summer of 2003. The last three focus periods all have clear linkages to key events in the history of the EU. Between 2010 and 2012, the sovereign debt crisis in the eurozone dominated the political agenda of EU member states, whereas between 2015 and 2017 the refugee crisis and the armed conflict in Ukraine were the most important and discussed political topics in the EU. The last peak year (2020) was caused by the Covid-19 pandemic, a key political event still ongoing at the writing of this article in February 2022.

What Figure 1 makes quite clear is that Finnish MPs have actually tackled European issues rather systematically, thus politicising European integration in parliamentary debates. Also quite evident is that plenary debates on European integration in the Finnish Parliament seem to follow wider public debates: the ebb and flow of discussion intensity has a rather clear linkage to developments in Europe in general, the EU in particular.

Overall, these results challenge, at least partly, the results presented by Auel and Raunio (2014, 19), who stated that "between 1995 and 2010 [...] the share of European debates was very low" and only "[a]fter 2010, however, [can we] observe a clear increase in the debating activity of the *Eduskunta*." Although the data collection and coding processes between their and my studies differ, the development in the latter time period – by Auel and Raunio covering the years between 2010 and 2013 – is confirmed, both as regards the numbers and the focus on the eurozone crisis, by my analysis. But according to my data, the former period (1995–2002) is characterised by rather intensive debates on European affairs.

Considering the volatility of Finnish parliamentary debates on European integration, the results confirm findings of previous studies that references to European integration affairs accumulate around major events on the European agenda. Hence, major European events seem to spill over into national debates, especially when national interests are at stake or parties seek to increase public awareness of certain European questions (Rauh 2015; Gattermann et al. 2016; Winzen et al. 2018).
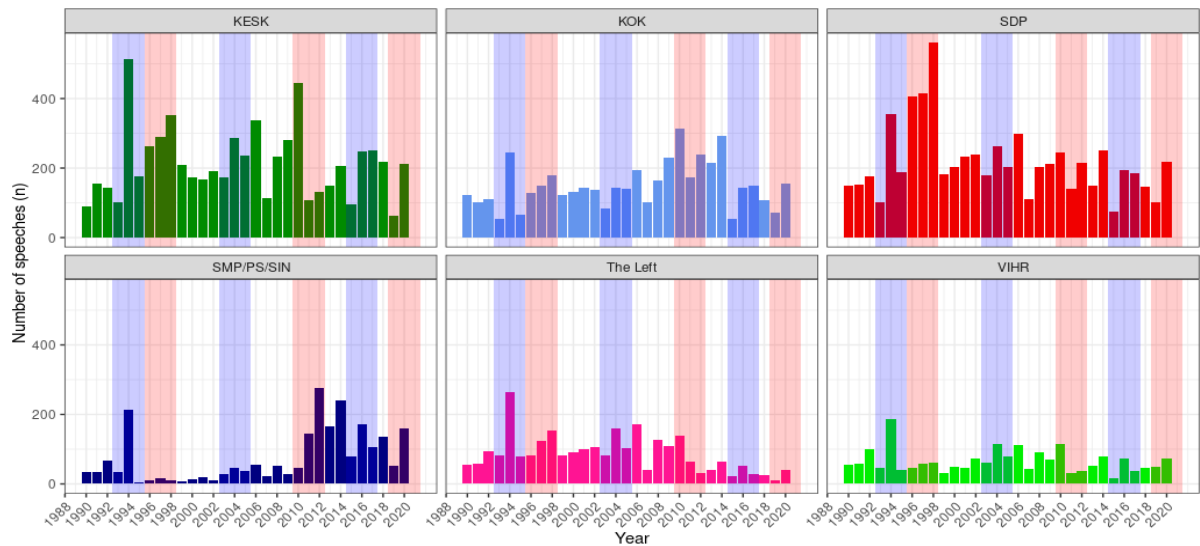
Figure 2: Intensity of plenary debates on European integration 1990–2020 (focus time periods marked with coloured rectangles).

Figure 2 shifts the viewpoint from the overall development over time to the debating activity of the main pasrliamentary groups and factions in the period from 1990 to 2020. The biggest parties – Centre (marked as "KESK" in the figure), the Conservatives (KOK), and the Social Democrats (SDP) – are the most active debaters. Considering the "filibuster debate", the figure confirms the dominance of the Centre Party as the main representative of the EU-critical agricultural sector. Further, the graph confirms that leftist and right-wing populist parties, as well as some leftist-oriented green MPs, were actively involved as obstructionists in 1994. An interesting finding is the active role of the Social Democrats in debates on the introduction of the final stage of the European Monetary Union from 1996 to 1998. As expected, right-wing populist parties have become more active debaters since the outbreak of the eurozone crisis, but especially since the refugee crisis. One slightly surprising finding, however, is the rather modest role of the Conservatives, for they are found to be mostly pro-European. A closer look at their activity seems to permit the conclusion that they were more strongly involved in the economic debates revolving around the politics of the sovereign debt crisis in the eurozone in the early 2010s.

These results are well in line with previous studies tackling the role of different parties in plenary debates on European affairs. Two points are worth highlighting here. First, the increase in activity of right-wing populist parties (see "SMP/PS/SIN" in Figure 2) since the eurozone crisis strongly correlates with the increase in the electoral share of these parties in the same period. Additionally, in Finland this has, as previous studies suggest, resulted in their stronger involvement in the plenary debates as a forum for political communication (Auel & Raunio 2014). And second, the overall increase in debating activities means that European issues have become more politicised and politically contested (de Wilde 2011). This, in turn, strengthens the role of parliamentary debates as the primary domestic political means by which to influence and control governments' policies and actions at the EU level (Kröger & Bellamy 2016; Wonka 2016).

Turning now to vocabulary analysis, I start with a closer look at the core vocabulary used in the different focus periods. For this purpose I created a dedicated dataset consisting of the so-called KWIC (Key Word in Context) data. This analysis focuses on words used around the key term, thus helping the researcher to better understand the different contexts in which the key term is used.

Table 1

Top 15 context words by time window

1993–1995 (n)	1996–1998 (n)	2003–2005 (n)

Table 1 presents the top 15 context words used closest to one of the key terms ("eurooppa","eurooppalainen","eurooppalaisuus"; see section 2) in each focus period. As expected, "unioni" (union) is the most used context word across time. Hence, the frequent use of the word combination "eurooppa" and "unioni" – i.e. European Union – indicates that a great share of plenary speeches deal with the EU.

Plenary speeches in the first focus period (1993–1995) tackle the question of Finland's membership in the EU. This is evidenced by such top context words as "jäsenyys" (membership), "jäsen" (member), and "liittyä" (join). During the second focus period (1996–1998), the approaching European Monetary Union (EMU) and the single currency euro are the central frameworks for the plenary debates. Once again, Finland's future membership in the eurozone is thematised by the use of words like "jäsen" (member), "jäsenyys" (membership), "yhteinen" (single, common), and "liittyä" (join), whereas the economic context is present through words like "keskus#pankki" (central bank) or "talous" (economy). The economic situation is also dominant in the focus period 2010–2012, reflecting the attempts to stabilise the eurozone in general, and the Greek national economy in particular, during the global financial crisis (Salla 2021, 108ff.). Apparently, plenary debates in this period focused on shared fiscal policies ("talous"/economy, "tehdä"/to do, act, and "yhteinen"/single, common) and the role of European institutions ("keskus#pankki"/[European] Central Bank, "komissio"/Commission). Common policies are also under the spotlight in plenary debates in the focus periods 2015–2017 and 2019–2020, as the MPs discussed the state of European security and the economy – "tilanne"/state, "turvallisuus"/security, "talous"/economy – and thematised European cooperation ("yhteis#työ") and common ("yhteinen") policies.

Table 2

Top 15 context words by political party

Centre Party (KESK)	Conservatives (KOK)	Social Democrats (SDP)
jätevesiasetus	laakkonen	opisto
kanan#muna	erilliskysymynen	vainoaminen
korteniemi	kouluateria	rumsfeld
lahjaverotus	kivennäis#vesi	ortodoksinen
peruselinkeino	manhattan	veroraja
tasa#painoinen	tasapainotavoite	koheesioturvallisuus
petos	savuketupakka	radiomasto
arvonlisävero#kanta	savuke	riskienhallinta
cap#tuki	kehruujenny-syndrooma	tukiasema
kiintiöjärjestelmä	perhesidehakemus	lääninhallitus
eta-yhteis#työ	yhteishallinnointiorganisaatio	kansalaisaloiteinstituutio
etsikkoaika	kriisinratkaisumekanismi	verotustieto
juhla#puhe	hammaslääkäri	jänneväli
jäsenyyshanke	menettely#laki	eläkeläisköyhyys
kalastusoikeus	talous#vuosi	markkinayhdentyminen
Right-wing populist parties	*The Left*	*Greens*
nettomenettäjä	kriisienhallinta#kyky	luonnonmaantieteellinen
miinanpolkija	kriisienhallintaoperaatio	vihreät

paita	emu-politiikka	maksimidirektiivi
tullialennus	asehankintaohjelma	siirtomaavaltaperinne
liberaalijärjestelmä	johannesburg	ympäristömerkki
parvekeyleisö	ilmasto-ohjelma	energiatekniikka
hongkongilainen	interventio-oikeus	kopiosuojaus
jamei	rauhanturvaamis#laki	osaamisteollisuus
parveke	ruoanhinta	siviilijoukko
perä#vaunu	ydinsuunnittelu#ryhmä	vaalivapaus
sandinisti	jyränki	sisus
taka-akselisto	sota#harjoitus	puolustusunioni
tuki#sopimus	kenraali#luutnantti	alijäämä#tuki
tekstiiliteollisuus	kriisienhallintavalmius	alistusperiaate
riemukaari	euronöyryys	eurokyyristely

Table 2 switches the analytical viewpoint in the KWIC dataset from time periods to the main political groups and presents the top 15 context words (in Finnish) most typical for each political group. For this part of the analysis, I applied a specific text mining method called term frequency, inverse document frequency *(tf-idf)* analysis. This method adjusts the frequency of a word for how rarely it is used by a parliamentary group in the collection of plenary discussions. A word's inverse document frequency (*idf*) was then applied to explore words that are not used very much during the whole period from 1990 to 2020. Here the idea was to capture changes in the vocabulary of a party over time, most probably caused by differences in ideological positions or other political factors.

The results presented in Table 2 lend support to the hypothesis that a party's ideological setting is well captured and reflected by words *differentiating* a party from other parties. For example, the Centre Party (KESK), as the strongest representative of the agricultural sector with a rather strong EU-critical position, stands out by the use of words related to primary production ("cap#tuki"/Common Agricultural Policy, "kanan#muna"/egg, "kalastusoikeus"/fishing rights, and "kiintiöjärjestelmä"/quota system). The Greens, in turn, remain faithful to their environmental core, represented by words like "luonnonmaantieteellinen" (ecological), "ympäristömerkki" (eco-label), and "energiatekniikka" (energy technology). Further, capitalism-critical and basic democratic attitudes and opinions can also be identified behind the use of words like "siirtomaavaltaperinne" (colonial tradition), "kopiosuojaus" (copyrights), and "eurokyyristely" ("euro crouching", a concept used by right-wing populists to blame the government for its uncritical stance on EU affairs). The Left, in turn, is differentiated from other parties by its anti-military discourses reflected by words like "kriisienhallinta#kyky" (crisis management capability), "asehankintaohjelma" (arms purchase programme), "interventio-oikeus" (intervention right), "rauhanturvaamis#laki" (peacekeeping law), and "sota#harjoitus" (military exercise). Further, similar to the Greens – evincing their ideological closeness – the Left also uses anti-capitalist rhetoric represented by words like "euronöyryys" (euro submissiveness) and "emu-politiikka" (EMU politics). The right-wing populist parties are characterised by a totally different language consisting of strongly figurative words like "miinanpolkija" ("mine stamper", a provocative concept used to draw attention to the use of child soldiers) or "parvekeyleisö" (balcony audience). This comes quite close to what Ihalainen and Palonen (2009) mean with the innovative use of concepts. The latter is used to refer to ordinary people following plenary discussions in the gallery of the plenary hall of the Finnish Parliament. Another interesting word is "nettomenettäjä" (net loser), used not only as a reference to Finland's net payer role in the EU, but also as a general criticism of Finland's EU membership.

Overall, the results from the tf-idf analysis are promising when it comes to exploring differences in the use of language rooted in the different ideological and political positions of the parties (Closa & Maatsch 2014; Hurrelmann et al. 2020). The results indicate that, as in other countries studied, in the Finnish Parliament parties not only use language to bring up their own political positions, but also to mark the differences between "us" and "them" (Hooghe et al. 2002; Auel & Raunio 2014). Further, right-wing populist parties in particular seem to favour colloquial language, thus knowingly challenging the more formal structures and rules of traditional parliamentary debates. The results lend at least modest support to the interpretation that right-wing parties tend to use provocative, even pejorative language in order to sharpen the rhetorical gap between them and other parties. Further, my data also confirm the polarisation between parties representing green/alternative/libertarian (GAL) ideologies on the one hand, and those representing traditional values, authoritarian ideologies, and nationalism (TAN) on the other (Hooghe et al. 2002; see also McMahon & Kaiser 2021). A clear exception to this pattern is the Finnish Centre Party, a centre-right party with strong roots in the rural regions and the agricultural sector, and traditionally rather sceptical about European integration.

I round off my analysis with an experimental Text Network Analysis of the KWIC dataset to explore topics hidden in this dataset. The methodological aim of this exercise is to present an alternative approach for topic modelling, especially to LDA. As pointed out above, I consider TNA a very powerful and robust method for text mining and analysis, for three main reasons. First, TNA offers a very powerful tool with robust fundamentals in network analysis and a rather simple and straightforward application. Second, since a node's – in the context of this article a word's or concept's – status depends on the underlying network structure, changes in a word's status indicate and reflect changes in the network structure over time. And third, through the application of network visualisations and the analysing of the structural properties of text networks, the underlying data can be explored from alternative perspectives in order to trace back discursive patterns within the text corpus. Against this background, TNA as a non-linear analysis method can provide us with new ontological understanding of the structural aspects typical of parliamentary debates. This new ontological understanding, however, is not only expected to shed light on how concepts connect in order to form statements. Beyond that, it can also help us to explore structures relevant for the understanding of how statements are organised within and across contexts.
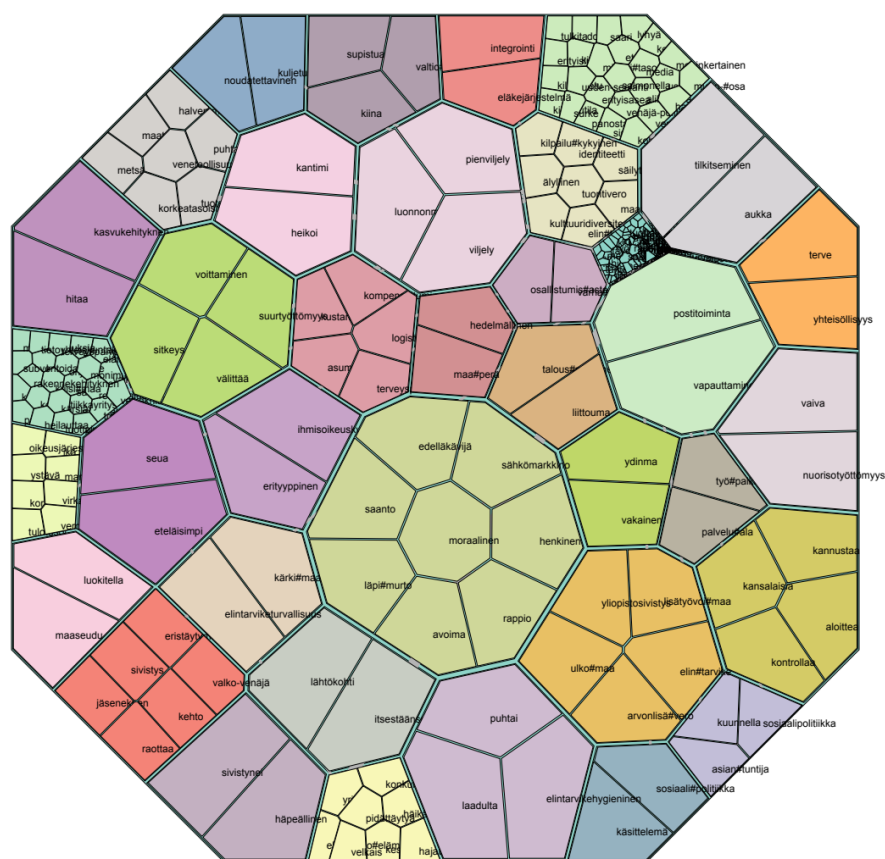
Figure 3: Main topics of plenary debates on European integration in the Finnish Parliament 1990–2020 (layout: Voronoi treemap).

Table 3

Three top topics in plenary debates on European integration in the Finnish Parliament 1990–2020

Cluster	Most influential content words
#1: Finland & globalisation	verrata (*compare*), panostaa (*invest*), kilpailuetu (*competitive edge*), saari (*island*), kohtuuton (*unfair*), venäjä-politiikka (*Russian policy*), dollari (*dollar*), kilpailijamaa (*competitor country*), erityisluonne (*special character*)
#2: Agriculture	maa#talous (*agriculture*), parantaa (*improve*), tukeminen (*support*), säilyttää (*preserve*), kohtalo (*destiny*), kärsiä (*suffer*), reuna-alue (*marginal area*)
#3: Economy	korkea (*high*), virka#mies (*official*), vero (*tax*), oikeusjärjestelmä (*legal system*), tulotaso (*income level*), markka-alue (*Finnish markka area*)

Figure 3 and Table 3 summarise the main findings of the TNA analysis. The network data were created from the KWIC dataset by pairing consecutive words within the same KWIC window. This network dataset was then imported to 'visone' (https://visone.ethz.ch/), a fully fledged network analysis and visualisation software program, for cluster analysis and visualisation. In order to improve the reliability of cluster analysis, all word pairs occurring only once were removed. This not only reduced the network in size, but also helped to focus the analysis on core patterns typical for the plenary debates. The remaining network size is 4164 nodes (words), paired with 6773 links (co-

occurrences). The most frequently used word pair is "suomalainen"+"yhteiskunta" (Finnish society), co-occurring 20 times in the KWIC network.

Next, the network was clustered by applying the Louvain clustering method. Since visone has a built-in support for the Louvain method, the application was rather straightforward. Although many other clustering methods are available, Louvain has proven to be a rather robust and reliable method for network clustering (Blondel et al. 2008). The underlying assumption here was that plenary speeches sharing a topic also share hashtags, so that an analysis of hashtag co-occurrence patterns can bring out thematic differences. In the last, sixth, step the clustered network was visualised in a diagram known as a Voronoi map organising it in a visually appealing way, making the identification of clusters rather simple. Another positive feature of Voronoi maps is that they make it rather easy to understand the cluster structure hidden in the data, plus to compare clusters in size and content. Voronoi maps were created to visualise the shared topics for debates in all focus periods.

Despite the fact that the clustered network shows a high modularity of .73, this might be affected by the size of the network and should therefore be interpreted carefully. The results of the Louvain analysis are somewhat difficult to interpret. In my opinion, this is due to the dataset used, since the KWIC data are rather limited in size. Hence, the clustering algorithm seems to face similar problems as when applied to a corpus of short texts. However, the content of the three top topics presented in Table 3 indicate that the workflow can identify different topics. The first cluster seems to consist of speeches dealing with issues related to Finland's and the EU's role in the global system, as evident in the use of words like "kilpailuetu" (competitive edge), "venäjä-politiikka" (Russian policy), "dollari" (dollar) and "kilpailijamaa" (competitor country). The second main cluster has a strong focus on agricultural – or in wider terms, primary production – issues, especially as regards Finland's peripheral location in the European north requiring special (national) support for the primary production sector. This interpretation is based on words like "maa#talous" (agriculture), "tukeminen" (support), "säilyttää" (preserve), "kärsiä" (suffer) and "reuna-alue" (periphery). The third-largest cluster is somewhat difficult to interpret, but words like "vero" (tax), "tulotaso" (income level), and "markka-alue" (Finnish markka area) indicate a connection to economic issues. However, the words "virka#mies" (official) or "oikeusjärjestelmä" (legal system) point to a rather different direction, e.g. to institutional questions and issues.

The three main thematic clusters identified by TNA display a clear difference as regards the content. From this perspective, my data seem to confirm results from previous studies that have brought forth evidence that parties frame European issues in order to both politicise them and to give them a specific interpretation based on the party's own political and ideological preferences (e.g. Kosic & Triandafyllidou 2004; Wendler 2011, 2013; García Lupato 2014; Kinski 2018). Further, the main topics also confirm the finding that national parliamentary debates on European integration predominantly tackle and focus on issues and questions of national interest and not so much on supra- or transnational issues.

To sum up the analysis, the results are more promising and encouraging than disappointing. On its own, the descriptive analysis can reveal some interesting patterns both across time and between parties. There is also a rather clear connection between the observed changes in the intensity of the plenary debates over time and the real-world developments in Europe and beyond. The vocabulary-based analysis gives further support to the hypothesis that parliamentary debates not only tackle actual, topical issues, but are also used to manifest a party's own ideological and political positions and viewpoints, as well to demarcate political spaces between "us" and "them". Finally, TNA-based topic analysis brought forth promising results, indicating the usefulness of TNA when it comes to identifying the language-based structural patterns hidden in the document corpus.

4. Concluding Remarks

This article was an experimental study on how unstructured textual corpora could be explored by applying tools, techniques and workflows typical for Exploratory Data Analysis. The main aim was to analyse plenary debates on European integration in the Finnish Parliament from 1990 to 2020. During

this period, Finland joined the EU (1995), introduced the single currency euro (2002) and went through the eurozone crisis (2009–2012), the refugee crisis (2015–2017), and the Covid-19 pandemic (2020–), as well as having remained geopolitically involved in the still-ongoing conflict between Russia and Ukraine (since 2014). According to my analysis, all these topical issues have clearly affected parliamentary debates as regards both the intensity and the content. I will conclude my article with three summarising remarks.

First, one major objective of this article was to present and evidence the usefulness of computational exploratory text analysis for gaining new insights into the structure and dynamics of a collection of parliamentary plenary discussions. In this respect, the results are promising. I would especially like to highlight the possibilities of using network clustering methods for the exploration of topics hidden in the corpus. The KWIC dataset used for this TNA was somewhat too limited for a comprehensive analysis, but already in this form the results indicate that network clustering algorithms can identify contextually meaningful and relevant clusters.

Second, results from the empirical analysis also evidenced the analytical power of the rather traditional tf-idf method. With this method, I succeeded in gaining insights into and a better understanding both of changes over time and differences between parliamentary factions. By increasing the weight of words that are more common for a certain party, I could tackle not only terminological differences between the parties, but also succeeded in identifying how differences in political and ideological settings between the parties affect their use of language.

Third, although the results find rather strong commonality with findings from previous studies and, thus, are encouraging both in an empirical and methodological sense, the limitations of Text Network Analysis need to be addressed. As Diesner et al. (2012) point out, validation of the results can be difficult for densely connected large-scale networks. Further, techniques for text preprocessing, node identification, and link construction must be decided before mining text data for a network structure, since these decisions "could strongly influence the structure of resulting networks" (Shim et al. 2015, 75).

My further plans connect directly to these weaknesses and pitfalls in the analysis presented in this article. First and foremost, I will focus on elaborating on TNA as an alternative approach to topic modelling. In my opinion, the possibilities – but also limitations – of TNA as a text mining tool are under-researched. This article, together with previous studies applying TNA to unstructured text documents, offers valuable and promising starting points for these next steps. An interesting spin-off of this next step will be a comparative study between TNA and LDA in order to measure, evaluate and compare these two methods from the perspective of EDA of unstructured text documents.

One planned future step includes a more in-depth analysis of the use of vocabulary, especially from the perspective of content, conceptual change, and innovative use of concepts. For example, I will analyse contextual differences in the use of vocabulary around different core terms (Europe, European, Europeanism) in order to better tackle the similarities and differences in plenary debates between different aspects and dimensions of European integration.

Overall, the analysis presented in this article connects rather well with previous works and, thus, is supportive of the idea that EDA in general, and TNA in particular, could offer an interesting alternative method for computational content analysis. Since the method also seems to work quite reliably with smaller datasets, I can only encourage colleagues interested in this kind of analysis to test TNA tools.

5. Acknowledgements

6. References

K. Auel, T. Raunio, Debating the state of the union? Comparing parliamentary debates on EU issues in Finland, France, Germany and the United Kingdom. Journal of Legislative Studies 20:1 (2014), 13–28.

E. Alemán, and J. P. Micozzi, Parliamentary rules, party norms, and legislative speech, International Political Science Review (2021), 1–17.

C. Altinigneli, L. G. M. Bauer, S. Behzadi, R. Fritze, K. Hlaváčková-Schindler, M. Leodolter, L. Miklautz, M. Perdacher, Y. Sadikaj, B. Schelling, C. Plant, The Data Mining Group at University of Vienna: Clustering, Causality, Massive Data and Applications. Datenbank-Spektrum: Zeitschrift für Datenbanktechnologie 20:1 (2020), 71–79. DOI: https://doi.org/10.1007/s13222-020-00337-9

J. Aunesluoma, Odotuksia ja pelkoja. Keskustelu Suomen EU-jäsenyydestä 1989–1994, in: K. Elo (Ed.) Suomi 25 vuotta Euroopan unionissa, Sigillum, Turku, 2021, pp. 23–55.

E. Alemán, and J. P. Micozzi, Parliamentary rules, party norms, and legislative speech, International Political Science Review (2021), 1–17.

M.E. Bélanger, F. Schimmelfennig, Politicization and rebordering in EU enlargement: membership discourses in European parliaments. Journal of European Public Policy 28:3 (2021), 407–426. DOI: https://doi.org/10.1080/13501763.2021.1881584

D. M. Blei, A. Y. Ng, M. I. Jordan, Latent Dirichlet allocation, Journal of Machine Learning Research 3:4-5 (2003), 993–1022.

V. D. Blondel, J.-L. Guillaume, R. Lambiotte, E. Lefebvre, Fast unfolding of communities in large networks, Journal of Statistical Mechanics: Theory and Experiment P10008 (2008).

A. Brier, B. Hopp, Computer assisted text analysis in the social sciences. Quality & Quantity 45:1 (2011), 103–128.

A. Casero-Ripollés, Influencers in the Political Conversation on Twitter: Identifying Digital Authority with Big Data. Sustainability 13 (2021). DOI: https://doi.org/10.3390/su13052851

C. Closa, A. Maatsch, In a Spirit of Solidarity? Justifying the European Financial Stability Facility (EFSF) in National Parliamentary Debates. Journal of Common Market Studies 52:4 (2014), 826–842. DOI: https://doi.org/10.1111/jcms.12119

P. de Wilde, No Polity for Old Politics? A Framework for Analyzing the Politicization of European Integration. Journal of European Integration 33:5 (2011), 559–575. DOI: https://doi.org/10.1080/07036337.2010.546849

J. Diesner, K. M. Carley, L. Tambayong, Extracting socio-cultural networks of the Sudan from open-source, large-scale text data, Computational and Mathematical Organization Theory 12:3 (2012), 328–339.

S. Diwersy, F. Frontini, G. Luxardo, The Parliamentary Debates as a Resource for the Textometric Study of the French Political Discourse. Proceedings of the ParlaCLARIN@LREC2018 workshop, 2018, Miyazaki, Japan, 2018. https://hal.archives-ouvertes.fr/hal-01832649

J. Edlund, A. Daniel, M. Broden, C. L. Fridlund, L.-J. Olsson, M. P. Ängsal, P. Öhberg, Multimodal Digital Humanities Study of Terrorism in Swedish Politics: An Interdisciplinary Mixed Methods Project on the Configuration of Terrorism in Parliamentary Debates, Legislation, and Policy Networks 1968–2018. In: Arai K. (ed.) Intelligent Systems and Applications. IntelliSys 2021. Lecture Notes in Networks and Systems, vol 295. Springer. DOI: https://doi.org/10.1007/978-3-030-82196-8_32

K. Elo, A Text Network Analysis of Discursive Changes in German, Austrian and Swiss New Year's Speeches 2000-2021. Digital Humanities Quarterly 16:1 (2022). http://www.digitalhumanities.org/dhq/vol/16/1/000598/000598.html

F. García Lupato. Talking Europe, Using Europe: The EU and Parliamentary Competition in Italy and Spain (1986-2006). Journal of Legislative Studies 20:1 (2014), 29–45. DOI: https://doi.org/10.1080/13572334.2013.871483

K. Gattermann, A.-L. Högenauer, A. Huff, Research note: Studying a new phase of Europeanisation of national parliaments. European Political Science 15:1 (2016), 89–107. DOI: https://doi.org/10.1057/eps.2015.56

L. Hooghe, G. Marks, C. J. Wilson, Does Left/Right Structure Party Positions on European Integration? Comparative Political Studies 35:8 (2002), 965–989. DOI: https://doi.org/10.1177/001041402236310

A. Hurrelmann, S. Kerr, A. Gora, P. Eibl, Framing the Eurozone crisis in national parliaments: is the economic cleavage really declining? Journal of European Integration 42:4 (2020), 489–507. DOI: https://doi.org/10.1080/07036337.2019.1658755

P. Ihalainen, K. Palonen, Parliamentary sources in the comparative study of conceptual history: methodological aspects and illustrations of a research proposal, Parliaments, Estates & Representation 29:1 (2009), 17–34.

D. Kilroy, All the king's men? A demographic study of opinion in the first English Parliament of James I, 1604–10, Parliaments, Estates and Representation 41:1 (2021), 1–23.

L. Kinski, Whom to represent? National parliamentary representation during the eurozone crisis. Journal of European Public Policy 25:3 (2018), 346–368. DOI: https://doi.org/10.1080/13501763.2016.1253764

L. Kinski, B. J. Crum, Transnational representation in EU national parliaments: Concept, case study, research agenda. Political Studies 68:2 (2020), 370–388. DOI: https://doi.org/10.1177/0032321719848565

V. Koller, From text to political positions via discourse analysis: Introduction, in: B. Kaal, I. Maks,, A. van Elfrinkhof (Eds.), From Text to Political Positions. Text Analysis across Disciplines, John Benjamins Publishing, Amsterdam, 2014, pp. 163–169.

A. Kosic, A. Triandafyllidou, Representations of the European Union and the nation(-state) in Italian party discourse: A critical analysis of electoral platforms and parliamentary debates. Journal of Language and Politics 3:1 (2004), 53–80. DOI: https://doi.org/10.1075/jlp.3.1.06kos

S. Kröger, R. Bellamy, Beyond a constraining dissensus: The role of national parliaments in domesticating and normalising the politicization of European integration. Comparative European Politics 14:2 (2016), 131–153. DOI: https://doi.org/10.1057/cep.2015.40

S. Lee, J. Song, Y. Kim, An empirical comparison of four text mining methods. Journal of computer information systems 51:1 (2010), 1–10.

D. T. Lowry, A. Naser, From Eisenhower to Obama. Lexical Characteristics of Winning versus Losing Presidential Campaign Commercials. Journalism & Mass Communication Quarterly 87:3/4 (2010), 530–547.

T. Lynn, P. Rosati, B. Nair, C. Mac an Bhaird, An Exploratory Data Analysis of the #Crowdfunding Network on Twitter. Journal of Open Innovation: Technology, Market, and Complexity 6:3 (2020). DOI: https://doi.org/10.3390/joitmc6030080

M. Magnusson, R. Öhrvall, K. Barrling, D. Mimno, Voices from the Far Right: A Text Analysis of Swedish Parliamentary Debates. SocArXiv. April 4, 2018. DOI: doi:10.31235/osf.io/jdsqc

Z. P. Majdik, A Computational Approach to Assessing Rhetorical Effectiveness: Agentic Framing of Climate Change in the Congressional Record, 1994–2016, Technical Communication Quarterly 28:3 (2019), 207–222.

R. McMahon, W. Kaiser, Narrative Ju-jitsu: counter-narratives to European union. Journal of Contemporary European Studies 30:1 (2021), 1–9. DOI: https://doi.org/10.1080/14782804.2021.1949268

R. M. Morrissey, Archives of Connection. Historical Methods: A Journal of Quantitative and Interdisciplinary History 48:2 (2015), 67–79. DOI: https://doi.org/10.1080/01615440.2014.962208

P. Organisciak, B. M. Schmidt, J. S. Downie, Giving shape to large digital libraries through exploratory data analysis. Journal of the Association for Information Science and Technology 73:2 (2022), 317–332. DOI: https://doi.org/10.1002/asi.24547

K. Palonen, Kari, Rhetorical and Temporal Perspectives on Conceptual Change. Theses on Quentin Skinner and Reinhart Koselleck. Finnish Yearbook of Political Thought 3 (1999), 41–59.

K. Palonen, Eduskunnasta puhekunnaksi? Parlamentarismi retorisena politiikkana, Politiikka 27:2 (2005), 142–148.

K. Palonen, Four Times of Politics: Policy, Polity, Politicking and Politicization, University Printing House, Jyväskylä, 2007.

K. Palonen, Parlamentarismi retorisena politiikkana. Vastapaino, Tampere, 2012.

D. Paranyushkin, D., Identifying the Pathways for Meaning Circulation using Text Network Analysis, Research report, Nodus Labs, 2011.

C. Prell, Social Network Analysis: History, theory and methodology. SAGE, London, 2012.

C. Rauh, Communicating supranational governance? The salience of Eu affairs in the German Bundestag, 1991–2013. European Union Politics 16:1 (2015), 116–138.

A. Salla, The Euro Crisis 2010–2014: The Changing Role of the European Commission. Discourse Analysis of the Commission's Policies and Communication during the Years of the Sovereign Debt Crisis, and the Impact of the Debate on the Future of European Integration, Painosalama, Turku (Annales Universitatis Turkuensis, B559) https://urn.fi/URN:ISBN:978-951-29-8643-9.

J. Scott, Social Network Analysis. SAGE, London, 2013.

J. Shim, C. Park, M. Wilding, Identifying policy frames through semantic network analysis: an examination of nuclear energy policy across six countries. Policy Sciences 48:1 (2015), 51–83.

L. Sinikallio, S. Drobac, Minna Tamper, Rafael Leal, Mikko Koho, Jouni Tuominen, Matti La Mela and Eero Hyvönen: Plenary Debates of the Parliament of Finland as Linked Open Data and in Parla-CLARIN Markup. 3rd Conference on Language, Data and Knowledge, LDK 2021, Open Access Series in Informatics (OASIcs), vol. 93, pp. 8:1-8:17, Schloss Dagstuhl - Leibniz-Zentrum für Informatik GmbH, Zaragoza, Spain, August, 2021. https://drops.dagstuhl.de/opus/volltexte/2021/14544/pdf/OASIcs-LDK-2021-8.pdf

J. B. Slapin, S.-O. Proksch, Look who's talking: Parliamentary debate in the European Union, European Union Politics 11:3 (2010), 333–357.

K. Stuart, A. Botella, Corpus Linguistics, Network Analysis and Co-occurrence Matrices. International Journal of English Studies 9 (2009), 1–20.

S. Taniyici, Europeanization of Political Elite Discourses in Turkey: A Content Analysis of Parliamentary Debates 1994-2002. Turkish Studies 11:2 (2010), 181–195. DOI: https://doi.org/10.1080/14683849.2010.483853

T. Tiaynen-Qadir, A. Qadir, P. Alasuutari, Russia in world society: A comparative perspective on international references in parliamentary debates. Acta Sociologica 62 (2019), 228–242.

J. W. Tukey, EDA: Exploratory Data Analysis, Addison-Wesley, Reading, MA, 1977.

T. Underwood, A Genealogy of Distant Reading. Digital Humanities Quarterly 11:2 (2017). http://www.digitalhumanities.org/dhq/vol/11/2/000317/000317.html

J. Wang, Y. Zhang, J. Huang, J. Shen, Y. Wang, J. Wang, J. Hu, W. Lu, Analyzing International Relations from British Parliamentary Debates. Proceedings of the ACM/IEEE Joint Conference on Digital Libraries in 2020. Association for Computing Machinery, New York, 2020. DOI: https://doi.org/10.1145/3383583.3398565

F. Wendler, Contesting Europe, or Germany's Place in Europe? European Integration and the EU Policies of the Grand Coalition Government in the Mirror of Parliamentary Debates in the Bundestag, German Politics, 20:4 (2011), 486–505, DOI: https://doi.org/10.1080/09644008.2011.606314

F. Wendler, Challenging Domestic Politics? European Debates of National Parliaments in France, Germany and the UK. Journal of European Integration 35:7 (2013), 801–817. DOI: https://doi.org/10.1080/07036337.2012.744753

T. Winzen, R. de Ruiter, J. Rocabert, Is parliamentary attention to the EU strongest when it is needed the most? National parliaments and the selective debate of EU policies. European Union Politics 19:3 (2018), 481–501. DOI: https://doi.org/10.1177/1465116518763281

A. Wonka. The party politics of the Euro crisis in the German Bundestag: frames, positions and salience. West European Politics 39:1 (2016), 125–144. DOI: https://doi.org/10.1080/01402382.2015.1081512

L. Yang, X. Cai, Y. Zhang, P. Shi, Enhancing sentence-level clustering with ranking-based clustering framework for theme-based summarization. Information sciences 20 (2014), 37–50.

C. York, Exploratory Data Analysis for the Digital Humanities: The Comédie-Française Registers Project Analytics Tool. English Studies 98:5 (2017), 459–482. DOI: https://doi.org/10.1080/0013838X.2017.1332024