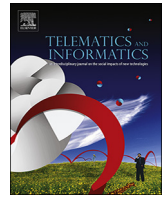


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Shared contexts, shared background, shared values – Homophily in Finnish parliament members' social networks on Twitter

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ABSTRACT

While Twitter has become an essential part of daily politics across Western countries, little research has focused on origins of politicians' social circles on social media. This paper contributes to how structural, ideological and contextual factors affect tie formation between parliamentarians' Twitter networks. The study focuses on Finland, where over 80 percent of parliamentarians are using the platform. For empirical analysis, we first extracted parliamentarians' followee network connections from their Twitter accounts (36 294 nodes and 113 108 edges) and combined it with data from a national voting advice application, which includes information regarding parliamentarians' societal position and opinions regarding social, cultural and economic issues. According to the explanatory analysis, we found that connections between parliamentarians and the share of mutual followees are clearly based on matching values, similar background and shared contextual factors. Additionally, we found that shared context had strong confounding effects on the function of value homophily in relations and shared networks between Finnish parliamentarians.

1. Introduction

Social media has become an essential part of daily politics globally (e.g. Larsson and Kalsnes, 2014; Vergeer, 2015) as political actors have set up profiles on various platforms. Yet, there is a growing concern that social media is working as an *echo chamber* which facilitates and even encourages ideological categorizations and political conflicts while reinforcing former opinions and blocking divergent views from spreading (Engesser et al., 2016; Hargittai et al., 2008; Lee et al., 2018). Although parliamentarians are at the core of political life, little research considers the construction of parliamentarians' Twitter networks in multi-party systems (see however Del Valle and Bravo, 2018; Teernstra et al., 2018). Earlier Finnish research has focused on politicians' social media networks in general, (see Laaksonen et al., 2017; Marttila et al., 2015; Railo and Vainikka, 2017; Vainikka and Huhtamäki, 2015), but research seeking to clarify mechanisms that explain the premises from which these networks are formed remains scarce.

In this article, we narrow this research gap by addressing the extent to which Finnish parliamentarians are directly and intermediately connected to one another on Twitter. More importantly, we examine how shared background, shared values, and shared contexts affect the formation of Finnish politicians' social media networks. By doing so, we can evaluate the importance of homophily in parliamentarians' social media networks and also assess how political cleavages and echo chambers manifest in social media interconnections in multi-party systems such as in Finland. Further, we focus on how shared offline contexts amplify and attenuate the effect of homophily on social media. Accordingly, we contribute to the wider discussion about contextual factors' confounding effects in social tie formation. Our empirical analyses are based on a unique dataset combined from Twitter network data and a

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national voting aid application (VAA).

Arguably, it is important to investigate parliamentarians' networks on social media. First, these networks formed by parliamentarians can reveal a great deal of information related to party political cleavages on social media. Voters select parliamentarians by candidates' political goals, characteristics, and values that voters consider important (e.g., Lau and Redlawsk, 2006). Thus, voters' interests, values, and societal position are in a sense condensed through voting behaviour in a way that elected parliamentarians can be considered *embodiments* of their parties. Second, parliamentarians' role as party representatives in a multiparty system such as in Finland requires considerable cooperation across party lines (Warwick, 1996). This urge for inter-party cooperation forms an expectation for parliamentarians' networks to have a high proportion of ties to different parties' representatives. Additionally, because parliamentarians' position is highly public, media presence in traditional media and increasingly in social media needs to be carefully considered. That is to say, the parliamentarians' public position emphasizes the significance of benefit-seeking action in tie forming on social media.

However, politicians' rational benefit-seeking actions and strategic use conflict with the boundaries of social action. In general, people tend to interact with other individuals who have a similar sociodemographic background, and who share the same surroundings and values (Lazarsfeld and Merton, 1954; McPherson et al., 2001). This phenomenon is described by the term *homophily* (McPherson et al., 2001), which is highly effective on social media platforms (Aiello et al., 2012; Bisgin et al. 2012; Del Valle and Bravo, 2018) and also among high-level politicians (Malang et al., 2017; Osei and Malang, 2018). Previous research shows that social media users tend to be in contact with those sharing similar values and sociodemographic background (Subrahmanyam et al. 2008; Reich et al. 2012) while also searching for information that supports pre-embraced understandings and beliefs (Lorentzen, 2016; Gilbert et al., 2009). Additionally, homophily has been to be crucial element directing the tie-forming among politicians (Fowler, 2006) and also information exchange between parliamentarians (Osei and Malang, 2018).

Due to homophily being a considerable force behind social actions on social media, calculated and strategic choices are difficult to implement when considering tie formation on social media. Previous research shows that even the high-level political elite are steered towards relatively isolated echo chambers (Barberá et al., 2015; Boutyline and Willer, 2016; Colleoni et al., 2014; Del Valle and Bravo, 2018; Peng et al., 2014). Thus, it is important to determine how various aspects of homophily affect tie formation between parliamentarians on social media. We assume that parliamentarians' shared party affiliation, shared regional context, status homophily, and value homophily play a crucial role in tie formation and also in the share of mutual followees. As such, we ask:

RQ1: To what extent do same party affiliation, shared regional context, similar sociodemographic factors and similar political values explain parliamentarians' reciprocal following and share of mutual followees?

We also expect that there is a close interplay between different aspects of homophily and different social contexts. In this research, we are especially interested in determining whether the connecting effect of shared background and shared values is amplified or attenuated in different social settings. Thus, we are interested in whether some background variables and values are connecting parliamentarians directly and intermediately in shared regional contexts and within parties. By studying differences in the effects of the sociodemographic variables and values in different social settings, we can assess how different types of homophily are affecting the construction of networks within parties and regions and also across these political boundaries. Thus, we ask:

RQ2: Are there interactions between different types of homophily and shared party affiliation when examining parliamentarians' reciprocal following and share of mutual followees?

RQ3: Are there interactions between different types of homophily and shared regional context when examining parliamentarians' reciprocal following and share of mutual followees?

Through these research questions, we can assess how Finnish parliamentarians' Twitter networks are constituted on shared party affiliation, shared regional context, shared sociodemographic background and shared values, and which kind of interplay there is between these different aspects of homophily and shared contexts. Accordingly, we are also able to assess political polarization of the Finnish public sphere between these high-level opinion leaders and also explain mechanisms behind this phenomenon, while having new and important information about homophily on social media networks between Finland's political elite.

The article is structured as follows. First, we present previous research on Twitter and political networks on social media. We then introduce the specific characteristics of the Finnish political field. Additionally, we present our empirical research design including data, methods, results and discussion. We conclude the article with a summary on the significance of the parliamentarians' social media networks on democracy and political decision-making processes.

2. Literature review

2.1. Study context – Twitter as a political space

Social media offers multiple different platforms for politicians to communicate with voters and each other. However, like in many other Western countries (Jungherr, 2016; Teernstra et al., 2018), in Finland Twitter has become an especially important means for politicians to express their views and concerns in terms of both popularity and access (Railo and Vainikka, 2017; Vainikka and Huhtamäki, 2015). Previous research shows that when comparing to other social media platforms, Twitter is a relatively open social media platform with a high amount of bridging social capital (Phua et al., 2017). As such, this platform's characteristics and provision of inter-party collaboration among parliamentarians are also motivating users to follow each other regularly. Compared to other

European countries, this is true while Finnish parliamentarians are relatively well connected over the party lines on Twitter (Teernstra et al., 2018). As such, despite the prevalence of other platforms among various user groups, Twitter networks provide a concise look into how information flows among parliamentarians and how those users are networked.

While earlier studies on Twitter networks have been criticized for not representing the population as whole (Hargittai, 2015; Jungherr, 2016), earlier research show that politicians are well presented on this social media platform (Railo and Vainikka, 2017). On a population level, Twitter users are considered to be a small and politically active group of people who are also more educated and younger than the average population (Bode and Dalrymple, 2014; Jungherr, 2016; Vaccari et al., 2013). This is also true in Finland; in the beginning of 2017, only 15 percent of Finns had used Twitter, and only 5 percent were utilizing it on a weekly basis (Koiranen et al., 2017). However, our target population is made up of Finnish parliamentarians who are well represented with over 80 percent of parliamentarians using Twitter.

The second problem with social media data is that it is difficult to estimate what content users consume due to selections being made by various personally modified algorithms (Beer, 2009). On Twitter, content is presented on a user's "Timeline" and is ordered chronologically based on the user's subscriptions (Bossetta, 2018). In contrast, content shown on Facebook's "News Feed" is significantly more filtered with various algorithms that filter content based on users' past behavioural patterns and consumption preferences online (ibid.), which makes it harder to assess what content users consume. In this sense, it is simpler to estimate what content users see on Twitter compared to Facebook, as algorithms do not customize content to such an extent and networked user content is presented directly and without filtering.

Earlier research shows that politicians themselves are relatively goal-oriented Twitter users (Jungherr, 2016; Bravo and Del Valle, 2017). For example, in his meta-analysis of 127 articles about political Twitter use, Andreas Jungherr (2016) found that politicians are highly media and campaign-driven. The most important motivations behind politicians' Twitter use are to inform on issues relating to politicians' campaigns, share links to news or content of their own, and to affect journalists and other media actors (ibid.). In this sense, for parliamentarians, Twitter is not just a platform for social interaction, but rather a tool for making a societal impact and promoting various interests.

Given that Twitter is the notable social media platform among Finnish parliamentarians and platforms features, Twitter networks offer relatively good data set for assessing how different subgroups are constituted and how shared political values, sociodemographic background and shared contexts are affecting to structures of networks on social media.

2.2. Homophily in social media political networks

Homophily is argued to be "one of the most striking empirical regularities of social life" (Kossinets and Watts, 2009), which "limits people's social worlds in a way that has powerful implications for the information they receive, the attitude they form, and the interactions they experience" (McPherson et al., 2001). In their groundbreaking research, Lazarsfeld and Merton (1954) have divided homophily into two different types: *status homophily* and *value homophily*. Status homophily refers to shared sociodemographic dimensions such as age, sex, race, ethnicity, place of residence, education, and occupation. Value homophily, on other hand, includes different sets of shared attitudes, abilities, beliefs, and aspirations (ibid.).

Earlier research indicates that both status homophily and value homophily play an important role in tie formation on social media in general (Aiello et al., 2012; Bisgin et al., 2012; Lönnqvist and Itonen, 2016) and among politicians' social media networks (Barberá et al., 2015; Colleoni et al. 2014; Del Valle and Bravo, 2018; Peng et al. 2014; Boutyline and Willer, 2016). For instance, Del Valle and Bravo (2018) found that Catalan parliamentarians' communication on Twitter is highly polarized along party lines and ideological categorizations. Additionally, earlier research suggest that homophily is an important factor behind politicians' actions and tie-forming in parliaments (Fowler, 2006; Malang et al., 2017; Osei and Malang, 2018).

At the same time, offline structural segregation among politicians greatly affects politicians' choices and communication partners on social media platforms. Previous research shows that social media networks are often built around relationships already existing offline, such as with family members, friends, and acquaintances (Reich et al., 2012). However, relationships in the social media sphere are also formed with previously unknown people. This kind of relational driving force is often an element of homophily through an interest in content being created, which may also encourage the formation of follower-followee relationships with already known or distantly known people.

However, while followers of political actors on social media can be motivated by the information being produced or shared, the highly motivating factors may also be values linked to certain institutions, personal reputation or societal position. As such, the relationship between content creator and follower on social media contains various cultural and affective links that can be used to distinguish oneself from others while also creating strategic familiarity with someone else. We suggest that whom one follows can also act as a signal to others of social status, cultural affiliations, and value systems. Due to the high visibility of social networks online, social media activity becomes a particularly important aspect of the public image to be managed effectively by parliament members. For example, following intellectuals or famous artists may reflect positively on a follower as a sophisticated actor, while following a neo-Nazi organization's Twitter account may communicate that a follower is supporting a similarly harmful ideology.

In this sense, there is a need for research that concentrates on follower-followee networks. Additionally, when focusing on follower-followee networks, the assessment of whom parliament members choose to follow publicly on social media becomes a particularly valuable point of research, given that followers gained through public social media activity is the less personally regulated visible component of the two. The strategy behind whom one chooses to follow, given public visibility of that action, is an important component of understanding the social networks of public actors while also revealing the significance of homophily at a wider scale. Regarding this, it is important to also study what kind of networks parliamentarians share with each other. This not only

reveals how parliamentarians share the same information but also how they share the same interests.

According to earlier literature on the formation of networks, it is important to recognize different *shared contexts* in which ties are formed (McPherson et al., 2001). Thus, different commonly shared contexts on different layers of politics are important factors in tie formation between parliamentarians. First of all, the region where a parliamentarian is selected plays a crucial role in parliamentarians' social lives. Parliamentarians from the same region have most likely been actively in contact with each other also in the municipal or regional level of the political system. People, in general, are more likely to be in contact with those who are close geographically and those who share the same organizational context (McPherson et al., 2001). Additionally, parliamentarians are still connected to their region, because parliamentarians are almost always aiming for the next election season from the same region. In this sense, parliamentarians remain more linked not only to their colleagues from the same regions but also voters from these regions.

Previous research shows that partisanship is an important feature in politicians' social lives (Caldeira and Patterson, 1987; Peng et al., 2014). Parties can be considered groups whose members share multiple views, values, interests and societal positions (Koivula et al., 2018) as well as networks formed through party-related meetings and events (Faucher-King, 2005). In this sense, parties are close contexts where ties are formed by ideological premises connected to societal hierarchies and interests.

However, while earlier literature shows that homophily is important phenomenon directing social action, it is not such deterministic that earlier theories suggests. While shared contexts, like party and region, function as connecting factors in tie formation, earlier research indicates that different kinds of social settings may have a confounding effect on the formation of networks. For example, Feld (1982) noticed that shared organizational foci produced ties that were twice as homogeneous as would be expected by chance. On the other hand, in some organizational contexts, it appears that the organization reinforces nonhomophilous ties and allows them to function as homophilous (McPherson et al., 2001). In this sense, there is an interesting interplay between different aspects of homophily and shared context; shared membership in a context may either amplify or attenuate the efficacy of homophily in tie formation processes. These contextual anomalies show that homophily should not be treated as "universal natural law of social sciences". To attain a more accurate picture of important contexts affecting in Finnish parliamentarians' social lives, we next focus more precisely on the Finnish political sphere as a multipolar and divided field of political competition and cooperation.

2.3. Finnish political system and divided political field

Representative democratic multiparty systems such as the Finnish system can be seen as a social setting where different political actors are competing to promote their political goals that are tied to party voters' interests. In the sociological discussion, this political context is often characterized with the concept of *political field*. According to Pierre Bourdieu's political theory, the political field is a space where political actors compete for political capital by utilizing their habitus (Bourdieu, 1984). Political capital involves aspects such as social skills and, for example, the capability to win elections or to carry out policies; habitus refers to agents' internalized set of principles that direct their actions and evaluations. (Fligstein, 2001; Kauppi, 2003.) Although political capital is a rather simplifying concept (Kauppi, 2003), it offers an effective instrument for portraying the political sphere in a country like Finland while also complementing the concept of shared contexts; while the term *context* emphasizes the connective aspects of different settings, Bourdieu's political theory of *fields* reveals disruptive elements of these social venues.

In this respect, while the competition on the political field can have a dividing effect, especially between the parties, it can still be seen as having unifying functions as well. In Finnish parliamentary politics, different societal interest groups and values are represented by nine parties which compete with each other in parliament elections every fourth year. Still, the Finnish multiparty system has induced consensus-seeking politics; after seasonal electoral competition, parties are supposed to form stable majority governments through strong coalitions across traditional political cleavages and form government program through inter-party collaboration. In Finnish politics, this has been characteristic for decades. In this sense, consensus-seeking aiming for major governments through democratic cooperation can be seen as a key factor for maintaining interest group-based politics in a multipolar political system such in Finland; while parties remain distinct from each other, they are forced to collaborate if they wish to enter the government.

Traditionally, political parties in Nordic democracies have formed by class, regional and religious cleavages (Lipset and Rokkan, 1967). These cleavages are still visible in modern-day Finland. The Social Democrats and the Left Alliance still represent the interests of the workers and their unions; the right-wing party, the Coalition, typically represents the interests of employers, entrepreneurs as well the upper strata, and the centre-agrarian party Centre represents the interests of those living in rural regions and the self-employed (Karvonen, 2014: 29; Keipi et al., 2017). Also, the Christian Democrats still represent religious people Finnish society and the Swedish People's Party continues to maintain its position as a protector of the Swedish-speaking ethnolinguistic minority (Westinen, 2015).

However, the political field is also increasingly shaped by various new political questions (Bornschier, 2010; Inglehart and Norris, 2016). The political space in many western countries has been polarizing into new political cleavages based on libertarian-universalistic and traditionalist-communitarian values (Kriesi, 2010, 638; Inglehart and Norris, 2016). This new political cleavage has been also understood as a post-material value dimension (Inglehart, 2008; Inglehart and Norris, 2016) and the GAL-TAN dimension, which comes from words Green, Alternative, Libertarian – Traditional, Authoritarian, Nationalist (see Hooghe et al., 2002).

In Finland the political parties, namely the Greens and the Finns, are examples of the parties addressed to the GAL-TAN dimension. The Finns is underlining neo-conservative values such as skepticism toward gender equality and multiculturalism (see, e.g. Jungar and Jupskås, 2014), and the Greens is an urban ecological party emphasizing libertarian values (Saarinen et al., 2018; Bolin, 2016). However, it has been difficult to place these new political parties on the traditional left-right scale because of widely varied opinions between party representatives on issues concerning social and economic policy and the scale of the public sector (Koivula

et al. 2018; Polk et al., 2014). Concurrently, it is important to note is that the rise of the new parties also influences the alignment of old parties that are adopting a new direction for their policies (Abou-Chadi, 2016; Kriesi, 2010).

In this sense, while there are political struggles related to these different value dimensions between the parties, there are also struggles within the parties. Drawing on Bourdieu's concept of field, parties are not static or unanimous on any given political issue, but party members are involved in a constant dialog from which they form the party's official opinions and political goals (Faucher-King, 2005). Thus, there are different opinions related to different political agendas which may form internal and external conflicts and competition within parties (Saalfeld, 2009). In this respect, it is important to study how political questions related to different value sets are connecting and separating parliamentarians not only over party lines but also within the parties themselves.

Another important characteristic in Finnish politics is that the national political field is divided into multiple geographical subfields. In Finnish parliament elections, there are 13 electoral regions where some elected parliamentarians vary according to regional population. Following Bourdieu's concept of fields, these electoral regions show themselves as political fields which connect parliamentarians representing the same region. In sparsely populated countries like Finland, regions play a significant role in the political agenda (Niemelä and Saarinen, 2012). However, regions are also disruptive contexts for parliamentary candidates from same regions, due to their competing for the same votes. In this sense, from parliamentary candidates' point of view, their primary competitors may be from the same party or a party representing the same population groups and favoring similar political values and agendas.

In general, politicians are quite statically positioned as collaborators or competitors towards each other, but it depends on the certain political issue (for instance taxation policy, environment policy, welfare policy) or situation (election, the formation of government program, party congress) whether competitors turn into collaborators, and vice versa. Additionally, these roles may flip when moving more deeply into subfields of politics. In this sense, contexts, such as party and region, can be seen as connective and separating subfields, which may either amplify or in some cases attenuate the effects of homophily in tie formation between actors. In this sense, it is important to find out how these crucial political contexts are steering the social action in the social media space as well.

3. Data collection & methods

Our data are derived from two different datasets. First, we extracted the network connections from Finnish parliamentarians' Twitter accounts, and then added information from the national voting aid application (VAA). Twitter network data were collected between 8.2. and 17.2.2017 from Finnish parliamentarians' profiles who had active Twitter accounts ($n = 162$) by using NodeXL software. By active Twitter accounts we mean those accounts which had produced tweets actively. In addition to parliamentarians' followee ties, we also collected parliamentarians' basic information, such as the number of followers and followees, registration date, number of tweets and parliamentarians' demographic description. Our final network data contained up to 36 294 users (nodes) and 113 108 connections (edges) between parliamentarians and their followees. After this, we formed new data that involved every possible edge between parliamentarians ($n = 26\ 082$). In the second part of our analysis, we weighted these connections with a proportional share of mutual followees. We then added background variables from Helsingin Sanomat VAA, where parliament candidates answered questions regarding their background and general opinions regarding social and political issues (see Mäkinen, 2015).

In this research, we are not interested in the exact relations between certain parliamentarians or connections between certain parties, but we are interested in the network as a whole. In this sense, it does not matter who follows whom, which allows us to act more ethically and maintain the anonymity of parliamentarians in this study. Because of recognizability, we do not even review these connections on the party level. When maneuvering with these standards, results of this study do not harm any certain parliamentarian or even any certain party.

Our dependent variables are derived from Twitter network data. We treated parliamentarians' reciprocal following as a three-class variable, where 0 is "neither is following", 1 "source node is following," and 2 "both are following each other". Additionally, we formed a new variable to measure the share of mutual followees, which gets values between 0 and 1, where 0 means that there are no shared followees and 1 means that all followees are shared. Descriptive statistics for applied variables are presented in Table 1.

In earlier research considering Twitter networks, it has been difficult to dig deeper into social media networks because the information about users' backgrounds, opinions and values have been challenging to recognize. Additionally, especially in survey research and interviews considering homophily, it has been difficult to assess whether people are sharing the same values or are they assuming that their connections share the same beliefs and values. It is also hard to assess whether ties between people are formed due to actual political similarity or similarity on other social characteristics that are correlated with political views (McPherson et al., 2001). In order to tackle this problem, we have derived background variables from the Helsingin Sanomat voting aid application (VAA).

VAA's are tools to facilitate the vote-making process by which voters can get information on candidates' views and reflect their own opinions with candidates' or parties' opinions (Haukio and Suojanen, 2004). Unlike in many other countries, in Finland candidates can independently answer questions and due to this, in addition to the recommendations of the party, VAA also recommends candidates (Wagner and Ruusuvirta, 2012). However, we need to bear our mind that the data from these applications should still be treated with reservation. In some cases, answers can be seen as targeted and premeditated to get as many votes as possible (see Wagner and Ruusuvirta, 2012). Therefore, we must note that in addition to the values and political agendas of parliamentarians, the values and political views of voters are also reflected in VAA data. One way or another, candidates' answers can be still handled as reflections of driving forces behind their political actions.

Table 1
Descriptive statistics for applied variables, unweighted means, and standard deviations.

	Obs	Mean	Std.Dev	Min	Max
Dependent variables					
Reciprocal following	26,082	0,71	0,77	0	2
Share of mutual followees	26,082	0,19	0,18	0	1
Independent variables					
<i>Shared party</i>	26,082	0,16	0,37	0	1
<i>Shared region</i>	26,082	0,10	0,30	0	1
<i>Status homophily</i>					
Gender	26,082	0,50	0,50	0	1
Age (difference)	26,082	12,6	9,09	0	50
Education	25,920	0,65	0,48	0	1
<i>Value homophily</i>					
Socioeconomic (Left-Right)	22,760	1,23	0,90	0	4,00
Post-material (Gal-Tan)	22,760	1,06	0,77	0	3,80
Regional (Cen-Per)	22,760	0,86	0,64	0	3,25

The Helsingin Sanomat VAA¹ is based on a survey in which electoral candidates of Finland's parliament elections in 2015 were able to place themselves on a 5-point Likert-scale regarding 30 different propositions. In this scale 1 means "completely disagree", 2 "disagree", 3 "cannot decide", 4 "agree" and 5 "completely agree". Candidates were able to answer the Helsingin Sanomat newspaper's VAA before the elections. Overall, 1 763 candidates out of 2 146 (82%) in total answered this VAA, and only 14 out of 200 elected parliamentarians did not answer.

In our analysis, we measure status homophily with three different variables measuring similarity in sociodemographic factors, namely age, gender, and education. In our final data set these variables extracted from VAA data were modified to measures similarity/dissimilarity between parliamentarians. In this sense, the gender variable signifies if parliamentarians are the same gender, the age variable measures the age difference between parliamentarians, and the education variable measures whether both parliamentarians have a college or university degree². However, while there was quite many parliamentarians who did not answer to question considering education level, we retrieved and confirmed this information also from parliamentarians' web pages and from Finnish parliament's web page.

Additionally, we assess value homophily with three different value scales. By employing principal component analysis with the varimax rotation, we found three value dimensions from the VAA answers: socioeconomic (Left-Right), post-material (Gal-Tan) and regional (Cen-Per). Original questions and factor loadings are presented in Table A1. We begin our analysis by evaluating the direct effects of shared context, status homophily measurements, and value homophily measurements. After that, we analyze the impact of status homophily in more depth by assessing the effects of members' age difference and similarity regarding gender and education in different contexts. Finally, we will analyze the extent to which value homophily determines parliamentarians' mutual networking on Twitter when the status homophily measurements are controlled for simultaneously.

We examined politicians' probability of reciprocal following with the aid of logistic regression. Regarding predicting the share of mutual followees, we employed OLS-regression. We present direct effects in the tables as odds ratios (OR) and unstandardized regression coefficients (B). Also, we illustrate the interaction effects in figures as post-estimated predictions. As we have a total population sample from the parliamentarians who use Twitter, we did not show standard errors or p-values; rather, we evaluate the size of effects in order to obtain the most significant predictors.

4. Results & discussion

4.1. The big picture – Overall function of homophily (RQ1)

According to our results, there are visible political cleavages between parliamentarians on Twitter. As expected, most of the independent variables had a positive effect on both dependent variables (see Table 2). According to our results, partisanship is the most important homophily attribute among parliamentarians' social media networks, which is in line with previous research (Del Valle and Bravo, 2018; Peng et al., 2014). Partisanship has a substantial effect on both the likelihood to follow each other (OR = 5.50) and also the number of shared followees on Twitter (B = 0.09).

Also, a shared regional context stimulates the direct and intermediate tie formation between parliamentarians. Shared region also has an important effect as a shared context as parliamentarians from the same region have an almost two times higher probability of following each other (OR = 1.7). However shared regional context also had a slight effect on the share of mutual followees

¹ The Helsingin Sanomat VAA data is licensed under a Creative Commons Attribution 4.0 International License.

² In Finnish parliament there are only 35 parliamentarians who use Twitter and do not have a college or university degree. Because of the high amount of those with a college degree, we categorized the education variable in VAA data as a dichotomous variable, where 0 means "No college/university degree" and 1 stands for "College/university degree".

Table 2

Reciprocal following and share of mutual followees according to shared contexts, status homophily aspects, and value homophily aspects.

Variables	Reciprocal following	The share of mutual followees
	OR	B
<i>Shared party</i>	5.497	0.091
<i>Shared region</i>	1.740	0.011
<i>Status homophily</i>		
Gender	1.182	0.006
Age (difference)	0.986	0.000
Education	1.402	0.027
<i>Value homophily</i>		
Socioeconomic	1.621	0.018
Post-materialist	1.704	0.024
Regional	1.388	0.011

($B = 0.01$). Thus, it seems that politicians' social networks are still highly bound to offline networks.

Our results show that all factors measuring the *status homophily* – namely age, gender, and education level – predicted both reciprocal following and share of mutual followees. Same education level had a remarkable effect on parliamentarians' reciprocal following on Twitter. Parliamentarians with the same education level were more likely ($OR = 1.40$) to follow each other on Twitter, having also more likely the mutual followees ($B = 0.03$). The same gender had only a slight effect on relations formed between parliamentarians ($OR = 1.18$) and also on the share of mutual followees ($B = 0.01$). We also found that parliamentarians' likelihood to follow each other slightly decreased with the age difference ($OR = 0.99$), but the age difference did not affect the share of mutual followees. These findings establish the ongoing importance of sociodemographic background in the constitution of social networks.

Additionally, like in the case of status homophily, all ideological homophily attributes associate with both dependent variables. The most important value homophily attribute was similarity on the post-material value scale for both the reciprocal following ($OR = 1.70$) and the share of mutual followees ($B = 0.02$). The effect of similarity on socioeconomic value scale was only slightly weaker, as it contributes positively to the reciprocal following ($OR 1.62$) and the share of mutual followees ($B = 0.02$). Finally, the similarity of regional values also predicted the reciprocal following ($OR = 1.39$) and the share of mutual followees ($B = 0.01$).

In this sense, it truly seems that, like people in general (Engesser et al., 2016; Hargittai et al., 2008), Finnish politicians are also seeking like-minded company in the interactive spaces of social media. This notion strengthens the assumption of Twitter as a social space, which maintains polarization between supporters of different value sets and can weaken the possibility of participation in political discussion and eventually strengthen the echo chamber effect in societies.

These findings are in line with earlier discussions concerning parliamentarians' embeddedness in cultural and societal structures. It seems that any kind of similarity escalates the formation of direct or intermediate networks between parliamentarians. In multi-party political systems, as in Finland, politicians can be seen as representing certain ideologies and policies (Lipset and Rokkan, 1967; Mair and Mudde, 1998), which are deeply connected to the interests of certain population groups (Dalton et al., 2011) and profoundly affect politicians' social media networks (Del Valle and Bravo, 2018; Peng et al., 2014).

4.2. Homophily within Finnish parties (RQ2)

In the second part of our analysis, we analyzed the extent to which shared party interact with different forms of status homophily (see Fig. 1). Fig. 1 shows that there was a slight interaction effect regarding age when predicting reciprocal following according to party context. Parliamentarians close in age were more likely to follow each other on Twitter across party stratum, but age difference does not have an effect on the probability of following each other among those parliamentarians representing the same party. On the other hand, similar gender and education level have the same kind of effect on reciprocal following regardless of party affiliation. Accordingly, the proportional effect is slightly higher between those parliamentarians who are from a different party. In this sense, we can argue that party as context does have a slight attenuating effect on status homophily's influence regarding age and gender when assessing parliamentarians' reciprocal following.

Shared party context does not have a clear interaction on the effect between status homophily attributes and share of mutual followees. Again, the proportional effect is slightly higher between those MPs who are from a different party but the party as context does not change the effect of the status homophily attributes. In this sense, we can argue that party as the context, in general, does not have strong amplifying or attenuating effect on how status homophily predicts the share of mutual followees.

Next, we focus on value homophily. We present the interaction effects of shared contexts on the relationship between value homophily and the dependent variables in Fig. 2, and the statistical model in Table A2. Socioeconomic values and regional values appeared to function as redistributive forces between representatives from the same party. Party colleagues who agree on socioeconomic issues were almost three times more likely to follow each other compared to those party colleagues who did not share these values. Additionally, those party colleagues who shared the same values on regional issues were over four times more likely to follow each other on Twitter. Additionally, the post-materialist values had a much weaker effect between party colleagues' reciprocal

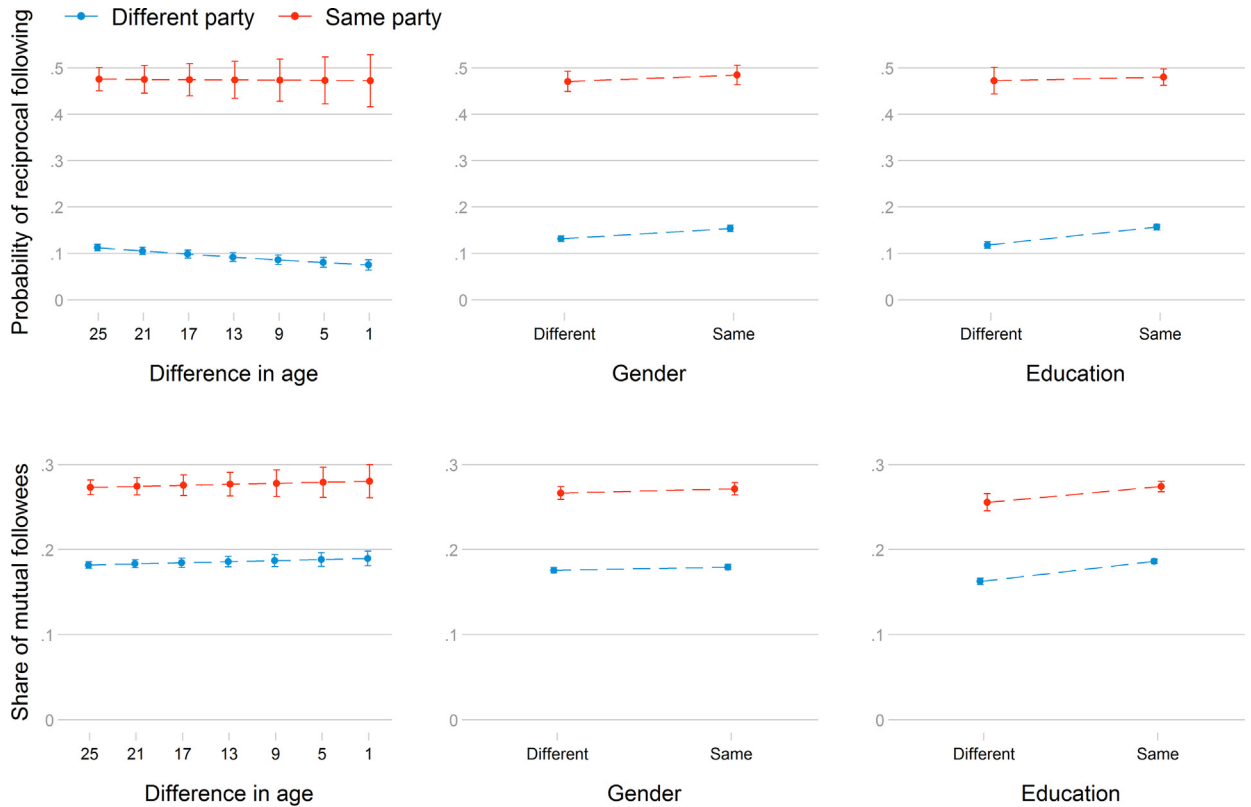


Fig. 1. Unadjusted effects of status homophily aspects when predicting MPs' probability of reciprocal following and share of mutual according to party context.

following. On the other hand, these values had the strongest connecting effect over party lines. It is also important to notice that shared regional values do not have any connecting effect between parliamentarians representing different parties.

Different value dimensions had dissimilar effects on the share of mutual followees as well (Fig. 2 and Table A3). As seen before, in general, the share of mutual followees increased when parliamentarians share the same values. Here, we also found the amplifying effect of shared party context. Parliamentarians representing the same parties had more mutual followees when sharing the same values compared to those who differed in these value scales. Furthermore, similarity on the socioeconomic and post-materialists value scale increased the share of mutual followees between parliamentarians representing the different parties, but there was no effect in terms of regional values. Significant here is that similarity or dissimilarity in regional values did not affect the share of followees between different parties' parliamentarians.

When assessing party as context, it seems that the function of status homophily is more or less universal, though having a shared party does not moderate the effects of status homophily to a wider extent. However, it seems that shared party works as a connecting factor when assessing age difference and gender effects on reciprocal following: it does not matter if the age difference is large or whether parliamentarians are of a different gender if they are from the same party. Accordingly, it seems that shared party offers a low threshold for tie formation between politicians, as it is natural to connect with people who function in a shared social surrounding (see McPherson et al., 2001) and it takes more commitment and effort to form ties with people from different contexts, such as other parties. In this sense, while those from shared political surroundings might be easily connected on Twitter, ties between those who are from different circles might be more likely to emphasize shared demographic characteristics in their tie forming efforts.

Shared contexts' confounding effect was even more visible in value homophily attribute effects on politicians' tie formation processes. However, it was more or less different when comparing to status homophily. Socioeconomic and especially regional values are highly redistributive forces within Finnish parties, as these values are less important on direct or intermediate tie forming between parliamentarians from different parties. However, similarity and dissimilarity on post-materialist political questions have more meaning in tie formation between parliamentarians from different parties. In this respect, it seems that parties, in general, are still clearly formed around traditional political questions connected to socioeconomic and regional issues, while post-material questions are more likely to unify parliamentarians from different parties (Abou-Chadi, 2016; Koivula et al. 2018; Kriesi, 2010; Polk et al., 2014).

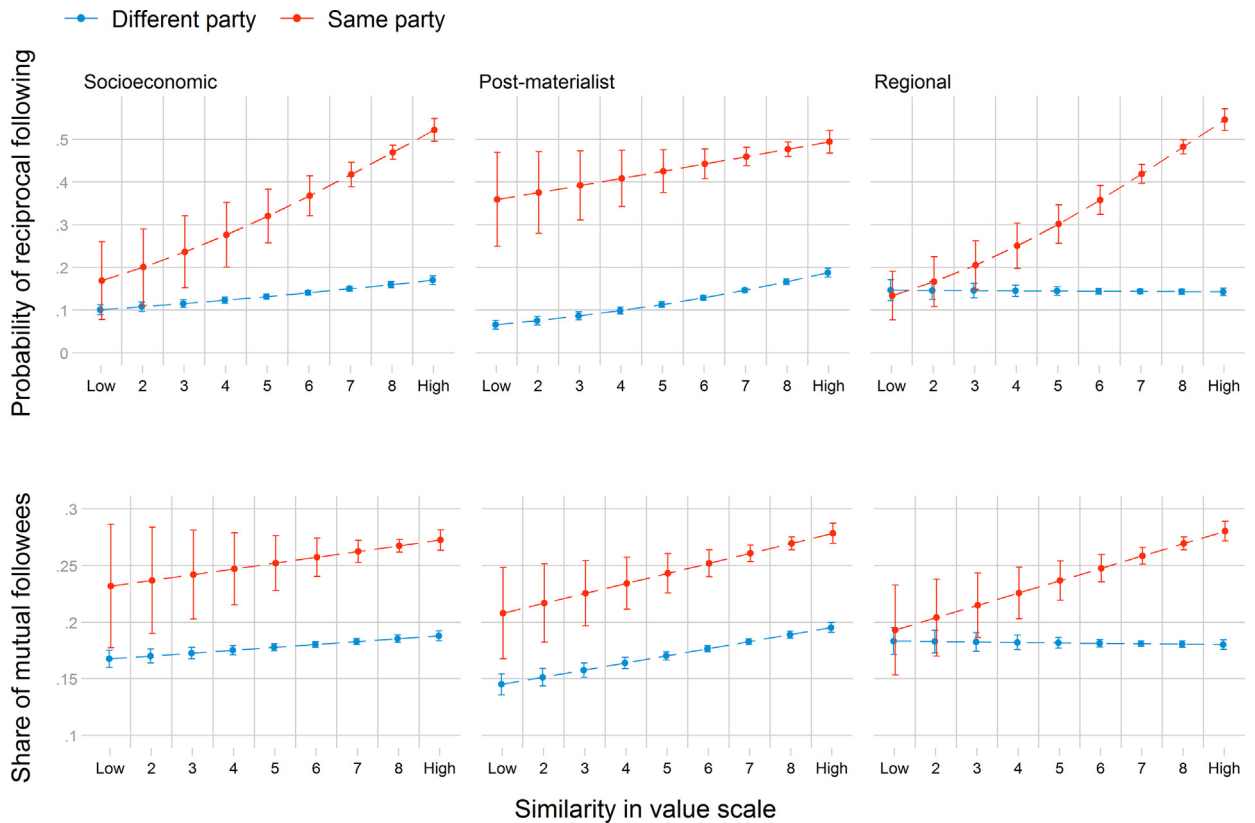


Fig. 2. Adjusted effects of value homophily when predicting MPs' probability of reciprocal following and the share of mutual according to party context (value dimensions and regression models are presented in Tables A2 and A3).

4.3. Homophily within shared regional context (RQ3)

We did not find clear interaction effects of shared regional context's and status homophily on reciprocal following (Fig. 3). Shared region has a slight amplifying effect only on how the same gender affects parliamentarians' reciprocal following. That is to say, parliamentarians who represent the same region and are the same gender are more likely follow each other on Twitter when compared to the gender effects between parliamentarians representing different parties. When assessing the shared region's effect on meaning of age difference and same education level, the different party representatives' proportional probability to follow each other grows slightly more, but there is not a strong interaction effect.

However, findings considering the effect of shared regional context's confounding functions are interesting to effects of shared party as a context. This underline how different contexts may either amplify or attenuate the effects of status homophily (see Feld, 1982; McPherson et al., 2001). Notably, some forms of similarity may have more importance in different social contexts. For example, when comparing to shared party context, the region has a different kind of confounding effect on gender, while the homophily effect is stronger among those parliamentarians who represent the same region and same gender.

When focusing on the interactions of shared regional context and the effect of value homophily on the reciprocal following, we did not find such clear interaction effects (Fig. 4 and Table A4). The shared region did not amplify or attenuate effects of similarity in socioeconomic and post-materialist value scales on the probability of reciprocal following. However, while similarity on regional values had the most explicit connecting effect between parliamentarians from the different regions, regional values do not seem to have any connecting effect between parliamentarians from the same region. Thus, it seems that shared region as context displaces the importance of regional political values.

Interestingly, there was a controversial interaction when assessing the share of mutual followees (Fig. 4 and Table A5), as similarity on regional values had a stronger effect for those elected from the same region when compared to those elected from different regions. Parliamentarians from the same region who disagree on regional questions tend to have a lower share of mutual followees compared to those who disagree and are from different regions. In this sense, we argue that political questions connected to regional values are more likely to connect and separate parliamentarians who are from the same regions. Instead, we did not find remarkable interactions of shared region and the similarity in socioeconomic and post-materialist value scales.

Notable is that the shared regional values' effect is different compared to the formation of direct ties and shared networks. Similarity or dissimilarity do not have any effect on parliamentarians' direct connections, but strongly disagreeing parliamentarians representing the same region share far fewer followees, and respectively, the shared regional values are highly connective factor for

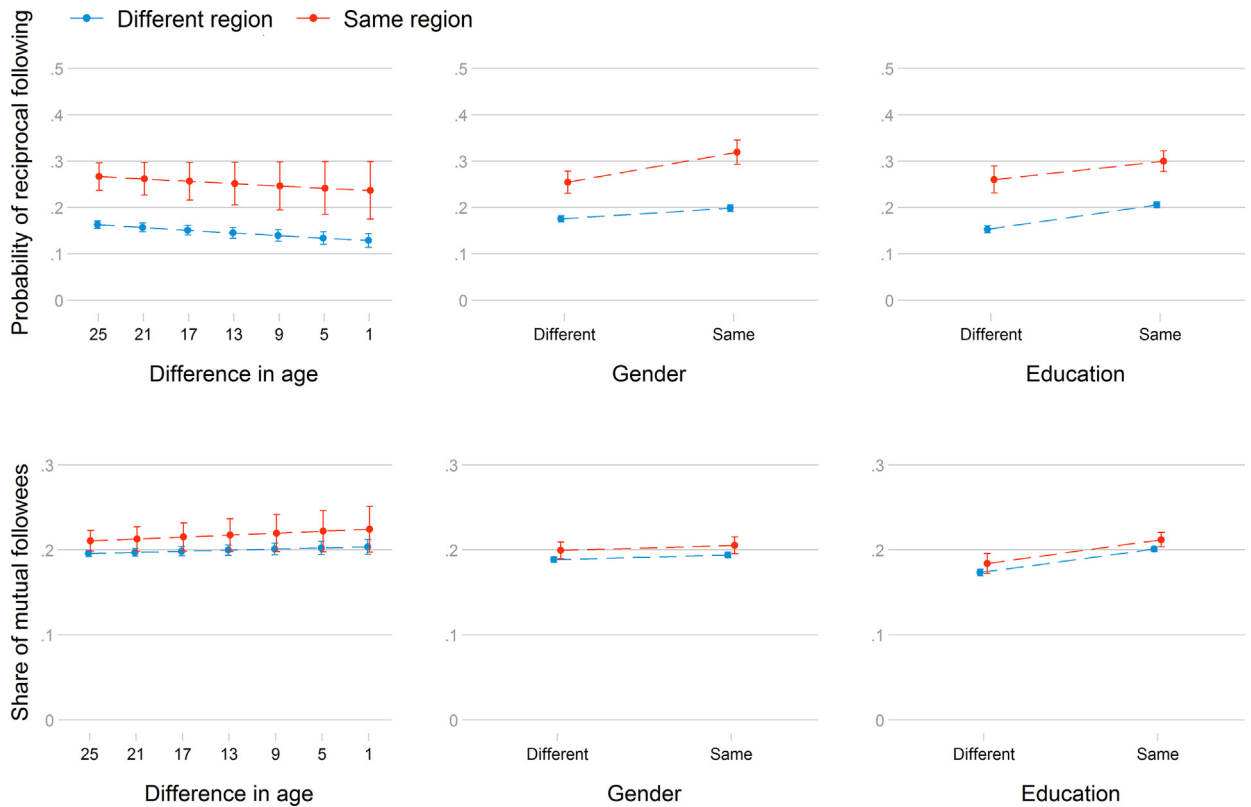


Fig. 3. Unadjusted effects of status homophily aspects when predicting MPs' probability of reciprocal following and the share of mutual according to regional context.

those representing the different regions. This finding highlights the importance of research on shared networks; while direct connections between parliamentarians seem to be equally distributed, networks where parliamentarians act and receive information can vary significantly.

5. Conclusion

This study shows how different aspects of homophily are having a crucial effect on Finnish parliamentarians' Twitter networks. The goal of our first research question was to define how Finnish parliamentarians are positioned in relation to one another on Twitter, and how different homophily attributes explain the constitution of parliamentarians' networks on this relevant social networking platform. Moreover, in our second and third research question we wanted to determine how various important political contexts, namely party and region, confound the effects of different homophily attributes.

On a general level (RQ1), it seems that any kind of similarity boosts tie formation between parliamentarians on Twitter. Additionally, similarity affects the structure of networks in a way that users sharing the same sociodemographic backgrounds and same values also share more mutual members in their networks. In this sense, it seems that structural and ideological tendencies are highly reflected in spaces of social media even between the high-level political elite, who are expected to co-operate with representatives from other parties actively.

Results of this research clarify mechanisms that explain the premises from which parliamentarians' networks are formed. Due to the spread of social media, users are more likely to be exposed to dissimilar political views when they consume news. In addition, the political news on the Internet has dramatically increased the diversity and openness of information overall (Gimmler, 2001; Xenos et al., 2014). On the other hand, recent research shows that people are driven into echo chambers that reinforce former opinions and block divergent views from spreading (Hong and Kim, 2016; Ingrams, 2017). Notably, according to earlier literature users of social media tend to be in contact with other users who share similar views and tend to search for information that supports already accepted perspectives and beliefs (Gilbert et al., 2009), which can act to polarize the social spectrum on any given issue (Lorentzen, 2016). Notions concerning the formation of echo chambers seem to be true also within the political elite.

This notion stresses the question about the social network structures' impact on democracy in general. If deeply drawn structures of societies control the networks of political elites, to what extent do these structures regulate social networks constituted online among other population groups that do not have such driven incentives to cooperate with ideologically distant others? This sort of political polarization may weaken functions of democracies, when different segments of population become more isolated from each

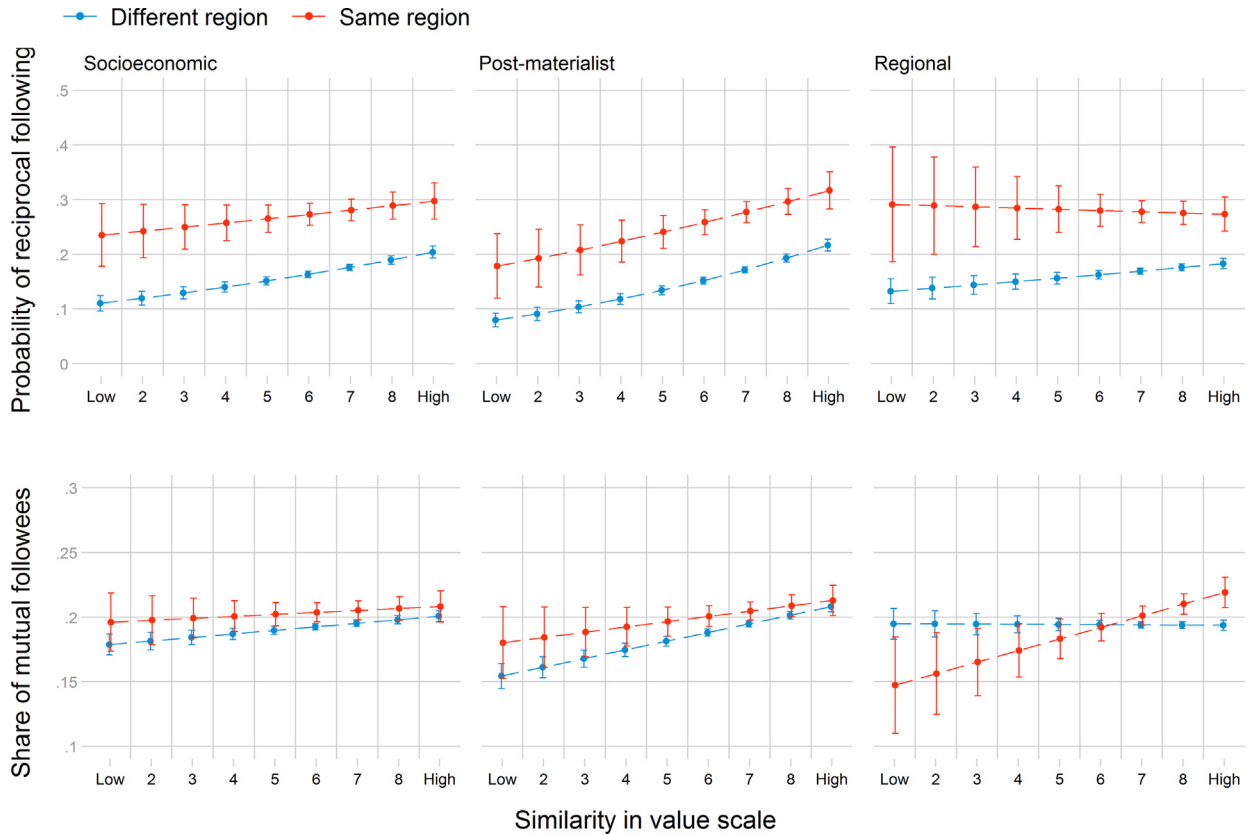


Fig. 4. Adjusted effects of status homophily when predicting MPs' probability of reciprocal following and the share of mutual according to regional context (value dimensions and regression models are presented in Tables A4 and A5).

other. Accordingly, high-level politicians should pay attention to the structure of their networks, have courage and empathy to actively cross different political borders, aim for constructive conversation with those who disagree on social media and act as role models for other users.

This study also shows that connecting contexts (RQ2 & RQ3), especially shared party, are confounding these homophilious tendencies. In some cases, shared contexts outplay the separating effect of dissimilarity; but surprisingly, in some cases, they are amplifying the importance of similarity. In this sense, this research also contributes to the wider discussion of different contexts' effects on homophily in tie formation processes. While homophily is argued to function as one of empirical regularities of social life on universal level (Kossinets and Watts, 2009), its operation changes when moving deeper in different social settings. This notion shows that homophily should not be considered as universal law of social sciences. Additionally, there are differences in how different types of homophily are functioning. While value homophily has a greater influence on tie formation between parliamentarians, it is simultaneously more complex and prominent in different shared contexts when compared to more universalistic and stable status homophily.

Notions of contexts' confounding effects emphasize that more theoretical research concerning the function of homophily in different social settings is necessary. Pierre Bourdieu's (1984) theoretical concept of political fields adds a functional element to the concept of context; different social venues are both connective and disruptive. Accordingly, future research should take a deeper look into the effects of shared contexts, diversify the functions of these social surroundings and also consider the type of homophily when assessing the formation of social relations and networks. This shows that there is a urgent need for different kinds of research – both quantitative and qualitative.

The significance of value homophily shows that, while parties are the most important connecting factor in tie formation, they appear also as fields of conflict which is also reflected in Twitter networks. Especially, socioeconomic and regional values are separating parliamentarians from each other within parties. Additionally, post-materialist values seem to connect parliamentarians over party lines, which is highlighting the role of these novel political questions as a disruptive political change in a historically shaped multipolar political field such as in Finland. The fact that traditional political parties are still having constant dialog in terms of how to position themselves towards these new political questions (Kriesi, 2010; Abou-Chadi, 2016) is also reflected in parliamentarians Twitter networks.

In terms of practical implications, the findings provide a valuable social map for decision-makers and other users of social media, and Twitter especially. The ingredients from which echo chambers emerge are clearly evident online and linked to how networks are

formed and exist. These interconnections are visible through interactional patterns and links to other users. Here, findings point to possible pathways that disruptive information is likely to travel online, which can be used to estimate the path of ideological clashes that might lead to political conflict. Furthermore, the findings add to the transparency of leaders' social life, a potentially valuable insight for constituents of various parties. This transparency also builds into the role of whether politicians' social networking and behavior are representative of the party and the political system at large, for example in terms of willingness to cooperate and reach across party lines. Finally, the findings encourage politicians' critical self-reflection in terms of assessing how personal behavior online may be affecting ideological bias or filtering of information flow based on how networks are built.

We need to acknowledge that our study has its limitations. Firstly, our data came from Twitter only. Some parliamentarians favor other platforms, such as Facebook, over Twitter for their political communication. In future research, it would be important to widen the scope from one certain platform to the other social media platforms as well. Secondly, our analyses were based exclusively on members of national parliament. In this respect, we are aware that parliamentarians' party affiliation often differs from other party members and others involved in various forms of political engagement. It would be important to recognize followers' political and ideological points of view, for example by analyzing the content of their tweets by utilizing machine learning methods. Thirdly, we only examined reciprocal following between parliamentarians and their shared followers. It would be important to assess functions of homophily in Finnish politicians' retweet and mention networks on Twitter. Future research should also focus more on homophily in the different social media networks of politicians and other elites such as journalists and the economic elite.

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Appendix A

Table A1

Original questions used to form different value scales from Helsingin Sanomat VAA and varimax-rotated factor loadings.

	Components		
	1	2	3
<i>Socioeconomical (LEFT-RIGHT)</i>			
q1 Government debt has to be turned down even though it means cuts in public services and welfare	0,75		
q2 Highly paid people's taxes should be raised (reversed)	0,63		
q5 Finnish public sector is too wide, and it needs to be scaled down	0,72		
q7 The obligation to take offered jobs needs to be made stricter	0,65		
q11 Corporations should be able to pay less salary to create more jobs	0,71		
q13 In social and health reform private sector health care services should be enhanced in the same position with public sector health care services	0,79		
q17 The government decided Finland to stay out from European Union's finance market taxation. Finland should join to finance market taxation (reversed)	0,65		
q25 Public sector services should be privatized more widely	0,80		
q26 If there is a situation, where it is necessary to either cut public services or raise taxes, raising taxes is a better option (reversed)	0,74		
q27 Wide income gaps between population groups are acceptable so that talented and diligent people can be rewarded	0,70		
q28 Present public services and welfare benefits are too big in the long run for the public economy	0,72		
<i>Post-material (GAL – TAN)</i>			
q3 Finland needs more nuclear power		0,59	
q4 Finland should abandon coal, peat and natural gas by the year 2025 (reversed)		0,61	
q19 More money should be given for Finnish military		0,48	
q20 Work permits are restricted for people outside from EU and ETA-area. This should also be continued in the future, and occupational immigration should not be released		0,57	
q21 Gay couples should have the same rights for getting married and adopt kids as straight couples (reversed)		0,51	
q22 If the government offers to open a reception center for immigrants in your hometown, the offer should be approved (reversed)		0,61	
q23 Nowadays students are handled too carefully. More strict discipline would make school better places		0,50	
q24 Traditional values, like home, religion and fatherland, form a solid foundation for politics		0,46	
q29 Economic growth and creating jobs should always set before the environment, if these two conflicting with each other		0,74	
q30 The environment should be considered in all policy-making processes and if its necessary projects which are harmful to the environment should be resigned (reversed)		0,73	
<i>Regional (CEN-PER)</i>			
q10 The number of municipalities should be decreased even with force if necessary			0,71
q12 Whole Finland should keep habituated, and the government should support this with tax revenues (reversed)			0,55
q14 Municipalities should be able to organize social, and healthcare services and this power should not be taken in social and health care reform (reversed)			0,64
q16 European Union membership has been more profitable than harmful for Finland			0,67

Table A2

Reciprocal following according to shared values and shared party affiliation, odds ratios.

Variables	M1	M2	M3
Same party	1.801	7.968	0.90
Shared socioeconomic values	1.159		
Same party * Soceco. values	1.313		
Post-materialist values		1.344	
Same party * Post-mat. values		0.854	
Regional values			0.991
Same party * Regional values			1.684
Observations	22,760	22,760	20,760
Pseudo R-squared	0.092	0.094	0.092

Models control for the effect of similarity in age, gender, education and residential area.

Table A3

The share of mutual followees according to shared values and shared party affiliation, regression coefficients.

Variables	M1	M2	M3
Same party	0.064	0.063	0.010
Shared socioeconomic values	0.005		
Same party * Soceco. values	0.005		
Post-materialist values		0.012	
Same party * Post-mat. values		0.005	
Regional values			0.000
Same party * Regional values			0.022
Observations	22,760	22,760	22,760
R-squared	0.039	0.041	0.039

Models control for the effect of similarity in age, gender, education and residential area.

Table A4

Reciprocal following according to shared values and shared region, odds ratios.

Variables	M1	M2	M3
Same region	2.486	2.506	2.686
Shared socioeconomic values	1.197		
Same region * Soceco. values	0.902		
Post-materialist values		1.336	
Same region * Post-mat. values		0.904	
Regional values			1.100
Same region * Regional values			0.889
Observations	22,760	22,760	22,760
Pseudo R-squared	0.0920	0.095	0.090

Models control for the effect of similarity in age, gender, education and party affiliation.

Table A5

The share of mutual followees according to shared values and shared region, regression coefficients.

Variables	M1	M2	M3
Same region	0.017	0.026	-0.047
Shared socioeconomic values	0.005		
Same region * Soceco. values	-0.002		
Post-materialist values		0.013	
Same region * Post-mat. values		-0.005	
Regional values			0.000
Same region * Regional values			0.018
Observations	22,760	22,760	22,760
R-squared	0.039	0.040	0.039

Models control for the effect of similarity in age, gender, education and party affiliation.

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.tele.2018.11.009>.

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