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**Doctoral School of
Sociology and
Communication Science**

THESIS SUMMARY

to the Ph.D. dissertation of

Emese Éva Túry-Angyal

titled

**Measuring Political Activity
How Online and Offline Political
Activities Connect**

Supervisor:

László Lőrincz PhD

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Sociology Doctoral Program

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I. Prior Research and the Relevance of Topic

According to Verba et al.'s widely accepted definition (Verba et al., 1995), political participation encompasses activities aimed at or resulting in the direct or indirect influence of government actions. It stands as an essential element within democracies (Verba et al., 1995). The advent of the internet, particularly in the era of web 2.0 (Kushin and Yamamoto, 2010), has facilitated novel modes of political engagement (Oser et al., 2013; Ruess et al., 2021). Online political activities can mirror their offline counterparts, translating traditional actions into a digital realm, like signing online petitions (Vissers & Stolle, 2014). Or, in some cases, online participation replaces its offline counterpart; for instance, in the early 2000s, contacting political figures via email gained popularity in the US comparable to postal mail or phone communication (Best & Krueger, 2005). Furthermore, online political involvement introduces entirely novel forms of participation without offline equivalents, such as using hashtags or sharing supportive images (Vissers & Stolle, 2014). The internet can bolster established modes of engagement while introducing new avenues for political action (Ruess et al., 2021), effectively serving as an expanded

platform for communication and information access. (Polat, 2005).

Within the realm of online political participation, particular emphasis has been placed on social media due to its pivotal role as a platform for both citizens and political entities. Social media usage has been linked to political events worldwide (Jost et al., 2018; Zhuravskaya et al., 2020): studies found that social media play a key role in coordinating protests via, for example, political information spreading (Zhuravskaya et al., 2020). Anecdotal and scientific reports claim the importance of social network sites in the Occupy protests or in the Arab Spring protests (Howard et al., 2011; Vissers & Stolle, 2014). Jost et al (2018) provide evidence about the role of Facebook during the protests in Ukraine in 2014 (Euromaidan), and Twitter in the case of Turkey in 2013 (Gezi Park demonstration), in the USA in 2012 (Occupy Wall Street) and Spain in 2012 (Indignados movement).

On the other side, political parties' campaigns utilize social media in the past, as citizens' activation through mobilization efforts by politicians can occur both online and offline. Larsson (2015) states on Norwegian example, that on the online front, party leaders encourage their supporters to share specific posts on Facebook as a way to engage and mobilize

their audience. Magin et al. (2017) view sharing content on social media as a low-threshold mobilization tool integrated into campaigns.

The importance of social media in informing may be understood by Katz and Lazarsfeld's (1955) two-step model of communication. It outlines how media messages are mediated by opinion leaders who then influence the masses through interpersonal interactions. This model has been explored in the context of politics, both before and after the rise of the internet and social media, but with the internet's emergence, the two-step model's relevance in politics increased, potentially challenging traditional mass media's dominance. Bene (2019) argues that regarding political topics on social media, opinion leaders contribute to the two-step effect, yielding more authentic and relevant political messages for users. The two-step flow on social media involves indirect influence when content is shared by visitors and followers with their acquaintances (Gibson & McAllister, 2015). This phenomenon underscores social connections' significance in information dissemination.

In essence, sharing plays a critical role in bridging the gap between online and offline political participation. Firstly,

sharing has significant mobilizational potential, as it allows politicians and parties to activate their supporters and engage them in online political activities. When party leaders urge their followers to share specific content, it can lead to increased participation and involvement in political campaigns both online and offline. Secondly, sharing also correlates with offline popularity. This is possible because posts that receive a high number of shares not only gain visibility within online social networks but may also influence offline discussions and interactions. As content spreads from user to user, it has more persuasive power, and the potential to reach a broader audience, which can have real-world implications for political events and outcomes.

The factors that can affect sharing behavior social media also are widely researched. In this thesis, two factors, the effect of emotions and network structure is analyzed on affecting the sharing behavior on social media.

Emotions are central to politics, as research indicates their significant role in decision making and political behavior (Sturm-Wilkerson et al, 2021; Muraoka et al, 2021; Jonas & Hoffmann, 2013). Eberl et al (2021) argues that political attitudes are composed of both cognitive and emotional components, with the emotional aspect often having a strong

influence on the perception and evaluation of issues and events.

Studies explaining the role of emotions in politics widely use the Affective Intelligence Theory (AIT) of Marcus (2000) (e.g., Sturm-Wilkinson et al, 2021; Jones&Hoffman, 2012). AIT draws on neuroscience to explain how emotions influence political behavior and demonstrates how different emotional states influence citizens' engagement with politics. According to the theory, emotions have a preconscious impact by activating two different subsystems when people react to different settings. Positive emotions like enthusiasm, pride, or hope signal the activation of the dispositional system, leading individuals to rely on heuristics and make routine decisions in familiar settings, while feelings of anxiety indicate the activation of the surveillance system, making individuals more aware of unfamiliar environments and reducing reliance on habitual behavior. This distinction may explain how the rational models of voter behavior may depend on emotions – in different emotional setting different decision might be rational (Sturm Wilkinson et al, 2021).

Additionally, the Spiral of Silence theory by Noelle-Neumann (1974) argue that regarding sharing their opinion, individuals are driven by a fear of isolation, thus are more likely to

express them in a supporting environment. Those who believe their views align with the majority tend to express themselves confidently, while those who perceive their views as opposing the majority often choose to remain silent, which is another type of mechanism of how emotions affect decision making.

Research in the field of digital communication and social media suggests that emotions can be transferred and have an impact on online platforms, too. Stieglitz and Dang-Xuan (2013) have shown that emotional content can be transferred and thus evoke emotional responses in receivers online, through computer-mediated communication (CMC).

Prior research found significant connections between emotional valence and shares of a post (Hansen et al., 2011). Positive (Berger et al., 2010; Stieglitz & Dang-Xuan, 2013), negative (Heimbach & Hinz, 2016; Stieglitz & Dang-Xuan, 2013) and neutral (Hoang et al., 2013) emotions were linked in the literature to message spread on social media, showing that there is no consensus about the effect of emotional valence in the scientific literature yet. Diversity, as introduced in Freeman (2020), in the context of emotions refers to post evoking a diverse range of emotions. This might elicit wider interest by reaching more diverse audience, or decrease the

level of engagement with the post by fragmenting user activity. In their study, Leong and Ho (2021) proves that Facebook Reactions are used to assess the public opinion regarding a topic, and that, in line with the SOS theory, individuals were more inclined to express their views when they accurately perceived the prevailing opinion climate to align with their own position on the issue.

Social network structure might also affect spreading information of social media, and thus the sharing behavior (Pegoretti et al, 2020). Social networks are build up on the social bonds that individuals share (Valenzuela et al., 2018). These connections offer people access to others' resources, yielding various advantages. In politics, this advantage translates to the potential to engage with previously undiscovered individuals, thereby reducing campaigning expenses (Valenzuela et al., 2018).

On social media platforms, these connections mirror real-life social networks (Vepsäläinen et al., 2017). The dissemination of shared news on these platforms exhibits distinct patterns influenced by network structures (Moreno et al., 2004; Pegoretti et al., 2012). Consequently, sharing content can yield diverse effects across different social media applications. Centola (2010) summarizes two main theories regarding this

issue. The first proposes that networks characterized by long ties (typically small-world networks) facilitate quicker information spread compared to highly clustered networks, because long ties minimize redundancy in the diffusion process by linking individuals whose social circles do not overlap. Conversely, other hypotheses suggest that networks with numerous redundant ties, clusters can reinforce specific behaviors or information, thus accelerating the reach of news to a broader audience.

In summary, prior research suggest that social media, especially sharing content on social media play a crucial role in politics. There are factors that can affect sharing, such as emotions and network structure. In this thesis, the research analyzes first the role of online political activities on real political activities, and second, it focuses on the online political activities, namely on sharing information on social media and these two factors that can affect it.

This research presents novel contributions to the field by employing diverse analytical methods, thereby contributing new statistical evidence to the existing knowledge base. The examination of the time-dependent nature of reactions on Facebook, as well as the impact of negative emotions on information propagation, substantiated using actual Facebook

data and network simulations aims to give a better understanding of online political activities, which might contribute to the application of such analyses in the future.

II. Methods and Data

Based on the literature, the thesis formulated three research questions regarding online political activities.

First, it assesses the relationship between online and offline political activities, both theoretically: analyzing the previous studies results, and practically: analyzing a Hungarian national sample.

The interplay between online and offline political activities holds significance in influencing political events and outcomes. Consequently, delving into the correlation between these two dimensions becomes essential. The thesis reviews numerous empirical studies that investigated this phenomenon concluding different results. Although to compare these outcomes of the scientific literature meta-analyses are already available in this topic by Boulianne (2014) and Skoric (2015), this thesis adds new statistical evidence by applying a Bayesian Update method on studies. The findings from international literature, combined with the results obtained through the Bayesian Updating method, provide strong evidence supporting the connection between online and offline political engagement. Additionally, a Hungarian national panel survey was analyzed in order to check how these political activities connect to each other in time. The panel data

contained three waves of data, which allowed to analyze the connection in time. The results reinforce the conclusions drawn from the previous analysis, indicating that, akin to global patterns, a connection between offline and online political activities prevails within the Hungarian context.

Second, the thesis focuses on the factors that affects sharing on social media.

To analyze social media activities, the thesis focused on the landscape of Hungarian politicians' Facebook usage. This step was imperative due to the observed influence of cultural disparities and platform-specific behaviors on the reliability of social media data analyses. As a result, the investigation concentrated exclusively on the Hungarian context. Facebook was selected as the platform of interest given its prominence among both politicians and the general population within the country.

Data was collected via Crowdtangle, a tool for Facebook data analyses. The data contained 146 posts by political parties and their leaders.

Based on the literature, the analysis focused on two factors of emotional effect borrowed from psychological research: the concepts of emotional valence, and diversity were analyzed on the number of shares posts gained. Reactions and the emotions they supposed to represent are linked to each other by

empirical evidence (Muraoka et al, 2021). To infer the emotional content of the posts from the reactions given to it rather than the text itself can help to identify actual user attitudes towards the content. However, Reactions do not only reflect the sentiment of the text of a post: Reactions can influence future Reactions given to the post, as they can serve as a clue to other user to interpret the post (Sturm Wilkerson et al, 2021). Also, the Reactions given to a post is depending on the algorithm behind the social media site, which allows it to be visible or invisible for users.

To analyze the content-related and independent effects of Reactions on Shares, the analysis utilizes different methods. Fixed effect regression filtered the post-specific content, OLS regression analyzed the content-related effects. Because non-content related effects may depend on time, it was incorporated in the models as independent variable.

Regarding diversity, a Herfindal-Hirschmann Index measured the concentration of Reactions. Additionally, a regression analysis on the Reactions measured how each type of emotion-reflecting Reaction affects the number of future types of Reactions.

The third aspect of this thesis is the effect of network structure on spreading information on social media. Building on the

results concerning the dynamics of sharing political news on Facebook, an agent-based model (ABM) was created to examine the impact of network characteristics. The agent-based model was developed using the software NetLogo. The model tests three different social network structures used in research to model social network sites: (1) a preferential attachment network (PA), (2) a small-world network structure, and (3) a random network. To create a more realistic environment, homophily of the network structure and the possibility of echo chambers was incorporated in the model.

1. Table Scenarios of the ABM

Scenario	Network Type	Number of Nodes	Average Node Degree	Number of Followers
A	Small world ($p = 0.1$)	400	4	20
	Preferential Attachment	400	4	20
	Random	400	4	20
B	Small world ($p = 0.1$)	1000	4	50
	Preferential Attachment	1000	4	50
	Random	1000	4	50
C	Small world ($p = 0.1$)	1000	10	50
	Preferential Attachment	1000	10	50
	Random	1000	10	50
D	Small world ($p = 0.05$)	400	4	20

The analyses used four different network settings to test the effects on different network structures. To assess regression models analyzed the results of the simulations.

III. Results

The results of the thesis can be summarized in eight points. Regarding the three research questions, the results are presented in the following.

The first Research question assessed the connections between online and offline political participation: Does political activity on social media platforms affect offline political activity?

The analysis answered this from two aspects.

1. First, a Bayesian Update method on 14 studies reinforced the connection between online and offline political participation.
2. Second, a three-wave panel data on a Hungarian sample reinforced the theoretically established connection in a culturally specific context. Both pooled OLS and fixed effect regression model supported the results.

Regarding the second research question, – How do the valence and diversity of emotions evoked by a post influence the number of shares received by that post over time on social media? – The analyses concluded the following.

3. Hungarian Facebook data analysis proved that posts that elicit more negative emotions (Angry reactions) tend to get shared more.
4. When analyzing the non-content related effect of Reactions on posts, Like, Love and Haha reactions in addition to Angry reactions have a significant effect on sharing. Non-content related factors can mean that the presence of these reactions can influence other users to share more or less, or that the algorithm prefers or dislikes posts with these reactions. Time is an important factor, as over time, Reactions affect Shares differently. Likes at first decrease sharing, but over time it increases. Angry reactions however, significantly increases the number of shares in the subsequent Timesteps in the second half of a posts lifespan, when all interactions decrease. This suggests that negative reactions facilitate sharing even in a later period. Overall, the presence of more Reactions cause more Shares in both Time Periods, while Comments did not show that effect.

5. The overall concentration of Reactions on posts did not affect the total number of Shares on posts, however, the concentration of additional Reactions in Timesteps, measured by HHI, increased over time, which means that the reactions to the posts might become unanimous over time.

Regarding network structures, the research question assessed the presence of echo chambers, homophily, and other network characteristics impacting the spread of a post within a social network.

Table 2 shows the results of the ABM analysis, that are summarized in the last two points.

2. Table Results of the OLS regression on the ABM

	Scenario A	Scenario B	Scenario C
Intercept	181.82***	371.5***	430.85***
Small World	-16.81	-105.2075	56.28
Preferential Attachment	-54.21*	4.07	-16.14
Homophily	-29.99	73.995	-66.94
Echo chamber	-90.93***	-163.725**	-164.81**
Homophily and Echo chamber	26.77*	-0.3233	55.44
Homophily in Preferential Attachment	12.61	-45.06	33.76
Homophily in Small World	19.38	16.035	81.75*
Echo Chamber in Preferential Attachment	17.8	22.31	-27.98
Echo Chamber in Small World	14.69	79.925*	-36.89
Observations	1200	1200	1200
Multiple R2	0.08634	0.06588	0.07807
Adjusted R2	0.07943	0.05882	0.0711

*Note: *p<0.05; **p<0.01; ***p<0.001*

6. The most important finding is that in the number of Shares, small-world networks

outperformed preferential attachment (Albert & Barabási, 2002) networks in the most tested environments. When comparing the different network scenarios, it was observed when network density was relatively low. This result may come from the specificity of the model that sharing is not automatic, but depends on the political alignment of the user. Therefore, if a central person is very negative towards a politician, it will not share the information, despite many of their friends did. Thus, high centralization in the model may stop the diffusion process, if the central person happens to be skeptical, while in less centralized or more dense networks the information easier bypasses easier.

7. Homophily has very diverse effects in different network settings. When more connections are between those whose interest is similar, the post will spread in greater extent between them, but it will faces challenges breaking out from that circle. In Scenario A, homophily restricts spreading, but in Scenario B, where the number of nodes is higher but

the average node degree remained the same, homophily promoted spreading, even in the presence of filter algorithms.

These findings offer novel contributions to the scientific research in this topic. They confirm the connection between online and offline political engagement, especially in the context of Hungary. Moreover, the study provides real-world evidence supporting the idea that negative emotions play a role in how information spreads on social media on Hungarian Facebook. Additionally, the research highlights how homophily affects information spreading differently in the different types of social networks, while supporting the importance of small world networks in information spreading. The analysis also applies diverse and less common methodologies in the field of sociological research about online political engagement, thus it provides new statistical evidence of the analysis of the research questions. Bayesian Update is introduced to analyze the studies about the connection of online and offline political participation, to compare the results of research with different designs of the field. The regression analyses of the Facebook data introduce a temporal dimension to the examination of Reactions' influence on post sharing. This allows for a more comprehensive

understanding of how reactions evolve and interact over time, providing insights into the temporal aspects of user engagement with political posts on Facebook. This is a significant difference from other studies about Facebook Reactions' effect on Shares, as they mainly utilize cross sectional data. However, the time-dependency of the effect of Reactions on Shares may be presumable, as the Crowdtangle Data Codebook states that posts on many social media platforms tend to display more variability early in their lives than later. Unlike cross-sectional analyses, which examine reactions at a single point in time, this study considers the temporal dimension of posts too, and thus able to confirm the varying effect of Reactions over time. This temporal approach sets this study apart from many other investigations focused on cross-sectional data, which overlook the dynamic nature of Reactions' effects over time. Regarding the ABM, virality on social media is widely used, but the simulation used in this analysis utilized the results of the regression analysis of Facebook data, thus aims to model social media more precisely.

Secondly, the research utilized dataset containing posts from Hungarian political figures on Facebook. While obtaining political data from Facebook is often challenging, particularly due to platform restrictions, Facebook holds substantial

significance within the Hungarian context. Analyzing this dataset allows for the exploration of the hypothesis that negative emotions encourage more sharing, while also mitigating potential confounding factors stemming from divergent user behaviors across different platforms and cultural settings. This context-specific analysis provides a targeted examination of how reactions impact political posts within the Hungarian political landscape. Furthermore, the study reinforces the theoretically grounded proposition of negative emotions' role in information propagation on social media within this culturally and geographically specific context.

IV. Main References

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V. Publications

Túry-Angyal, E., & Lőrincz, L. Sharing Political News Online: A Network Model of Information Spread on Facebook. *Intersections: East European Journal Of Society And Politics* (submitted)

Angyal, E. É., & Fellner, Z. (2020). How are Online and Offline Political Activities Connected? *Intersections: East European Journal Of Society And Politics*, 6(2), 81–98.

Angyal, E. É., Fellner, Z., & Fényes, C. (2017). Új kihívók. *Politikatudományi Szemle*, 26(4), 55–79.