

Pre-revolution network connections of the 1989 Polish Round Table participants

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Abstract

Between the late 1940s and the collapse of Communism in 1989, the Polish United Workers Party (PZPR) controlled nearly all facets of political and social life in Poland. Communist rule was contested regularly, however, with a spontaneous worker uprising in Poznań in 1956, a national student uprising in 1968, worker strikes in Gdańsk in 1970 and outside of Warsaw in 1976. These earlier uprisings were precursors to the strikes along the Baltic Coast that led to the creation of the independent, self-governing Trade Union “Solidarity” in August 1980. Solidarity was forced into the underground by a declaration of martial law in December 1981 but rebuilt itself as a broad-based social movement during the 1980s. When another round of strikes occurred in 1988, the Communist government turned to Solidarity to find a political solution to Poland’s endemic instability and the two groups joined Round Table meetings in early 1989. These negotiations resulted in a peaceful transition to a Democratic government later that year, the first revolution in a cascade of anti-Communist revolutions that swept the region in 1989/1990. Using a dataset of the institutional affiliations of the 567 Round Table participants, a purpose-built Shiny App for longitudinally analyzing the dataset, and a penalized logistic model, this paper shows that while the creation of the Solidarity Trade Union in August 1980 was the most transformational moment for the network structure that linked Round Table participants, events in 1968 were also highly predictive for whether an individual would end up on the Government or Opposition side of the Round Table.

Beyond its specific argument, this paper documents the process of converting analog records in physical archives to fully digitized data science tools for quantitative study of longitudinal social connections, with three primary contributions: (1) we discuss and present a rich data package consisting of activities and organizational affiliations of 567 Round Table participants from 1945 to 1989; (2) we provide an overview of a purpose-built Shiny App for longitudinally analyzing the Round Table datasets, paying particular attention to the challenges of structuring data and analysis to reflect real-world conditions; (3) we fit and assess a penalized logistic model to provide insight into which activities and organizations are predictive of particular affiliations at the 1989 Round Table.

1. Introduction

1.1. Historical Background^[1]

From January 1947 to August 1989, life in Poland was dominated by the Communist system. Shortly after the end of World War II, a number of communist and socialist parties merged to create the Polish United Workers’ Party (*Polska Zjednoczona Partia Robotnicza* or PZPR). In 1952, a new constitution was adopted, and the People’s Republic of Poland (PRL) — Communist Poland — was officially founded. Although ancillary parties, like the United Peasants’ Party (ZSL), the Democratic Party (SD), and a Catholic political coalition (PAX), held seats in the Polish parliament (Sejm), real power lay in the organs of the PZPR (“the Party”) most notably through its Politburo and Central Committee [Paczkowski 2003].

As a totalitarian, Communist state based on the Soviet model, the PZPR controlled nearly all aspects of public life. Social groups, including youth groups like the Association of Polish Youth (ZMP), existed to serve PZPR purposes. Party membership was often an important consideration in entering and maintaining a professional career, including positions in journalism, at universities, and within the Polish Academy of Sciences’ (PAN) research and educational institutes. Publications were heavily censored and government controlled [Curry 1984].

Even under strict Party rule, there were still spaces for independent life. Most notably, the Catholic Church maintained meaningful autonomy and created both physical and intellectual space for debating public issues, including in periodicals like “*Tygodnik Powszechny*.” Polish scholars and professionals could join international organizations and travel abroad, when given permission by central state organs. Poland was also notable for maintaining independent Scouting organizations, rejecting Soviet-style Pioneer groups [Persak 1996], Unofficial organizations, like salons and discussion circles, might exist, un-harassed at certain times, reflecting internal Party debates and factional tensions.

Shifts in Polish society often occurred in response to revolutionary moments, including worker riots in Poznań in 1956, student protests in March 1968, a worker uprising in Gdańsk in December 1970, and other worker strikes outside Warsaw in 1976. In each case, these events shaped activity that was independent of or in opposition to PZPR [Curry and Fajfer 1996]. (In Section 5.1 we explore these pivot points in further detail.)

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4

In response to the 1976 strikes, intellectuals and workers began a concerted effort to create a more cohesive social and political opposition movement. Underground, illegal publications — typically referred to as *samizdat*, *tamizdat*, or simply “independent” publications — proliferated. Movements critical of the state and the Party centered around independent groups like the Catholic Intellectual Clubs (KIK) formed first in the 1950s or more clearly oppositional groups like the Worker’s Defense Committee (KOR) formed in the mid-1970s [Bernhard 1993].

In August 1980, workers in Gdańsk and other Baltic Coast cities went on strike to protest price increases, calling for the creation of an independent trade union, one outside of the usual Party-imposed structures. After strikes spread nationally, the government came to the negotiating table and signed the Gdańsk Accords, which allowed for the creation of the Independent Self-Governing Trade Union “Solidarność” (Solidarity), led by the electrician and union activist Lech Wałęsa. Factories, universities, medical facilities, and artistic groups, among others, started founding committees to create Solidarity branches. Under intense Soviet pressure, however, the government imposed martial law in December 1981, declared Solidarity illegal, and interned thousands of Solidarity and opposition activists. In the wake of martial law, the government created a number of new groups meant to find a path forward, like the Patriotic Movement for National Rebirth (PRON) [Paczkowski 2003]. Simultaneously, Solidarity rebuilt itself as an underground movement with regional leadership structures and advisory committees. Illegal opposition groups proliferated across the country and following a final amnesty in September 1986, the Solidarity-led opposition movement resurfaced in public, but unofficial structures [Dudek 2004].

Following new rounds of nationwide strikes in the spring and summer of 1988, Wałęsa met with Minister of the Interior Czesław Kiszczak. The two sides agreed to pursue negotiations and a power-sharing agreement, leading to a series of public meetings known collectively as the Round Table negotiations. These negotiations occurred from February 6 to April 5, 1989. The Round Table negotiations developed a roadmap for semi-free elections in which both government and opposition figures would be allowed to run for all seats in a newly created senate (*Senat*) and for 35% of the seats in the existing parliament (*Sejm*). Solidarity-aligned candidates won overwhelming public support in elections held on June 4 and June 18, electing the first non-Communist prime minister since 1947, Tadeusz Mazowiecki [Castle 2003]. The Polish Round Table is often considered the beginning of the Revolutions of 1989, with Communists’ grip on power crumbling across Eastern Europe — from Hungary to East Germany to Czechoslovakia to Romania.

1.1.1. A quantitative approach to the Polish opposition movement

This data science project explores the networks and experiences connecting those individuals who participated in the Round Table (RT) Negotiations. These 567 individuals represent a group of Communist reformers, opposition activists, neutral “experts,” and “observers” from the Catholic church. One goal of this paper is to showcase a new public dataset that captures the public lives of these individuals from 1945 to 1989, regardless of which side of the Round Table they were on in February 1989. We then use this dataset to create a new exploratory network visualization tool, as well as to perform a predictive modeling analysis to identify influential organizations and moments in the lead-up to the Round Table meetings.

1.1.2. Longitudinal network analysis of Polish Round Table history

Network analysis is recognized as an important tool for studying the formation and mobilization of the opposition groups [Diani and McAdam 2003]. It is also recognized as a powerful tool for analyzing elite interactions [Keller 2018]. For the humanities, network analysis has shown great promise and results for investigating intellectual communities and political organizing across time, whether it is the underground networks of evangelical Protestants in Mary I’s England [Ahnert and Ahnert 2015], the correspondence and personal networks of the Republic of Letters in the 17th and 18th centuries [Edelstein et al. 2017], or the various social groups that came together to form the French Enlightenment. [Comsa et al. 2016] More generally, this project grew from the common recognition across the digital humanities that the connections between a large group of people would be difficult to analyze qualitatively, but that digital techniques could be used “to find ways to make very large data sets more tractable” [Ahnert et al. 2020, 44]. By creating an abstract network visualization, we believe it is possible to measure the connections among Round Table participants and provide quantitative insights, as “numbers have the ability to capture certain attributes that cannot be gleaned simply by reading text or looking at images” [Ahnert et al. 2020, 74]. And, as with most digital humanities work, the purpose of this effort is not only to generate metrics, but to then use those metrics to evaluate, substantiate, and/or refine existing arguments about the events in question.

Focusing specifically on the Polish revolution, the sociologist Maryjane Osa utilized network analysis to track the development of the political opposition between the 1950s and 1981, focused on a group of 23 pre-identified opposition groups, which were considered linked if groups shared members. Group membership was determined by lists maintained by the Polish Security Services. Osa’s work primarily argued for the importance of early Catholic mobilization to shape the opposition networks [Osa 2003]. More recently, a Polish scholar, Piotr Osęka, has completed a prosopographical study of Solidarity activists who participated in the trade union’s first National Congress in Fall 1981. This study, however, does not utilize any network analysis techniques to track or analyze this opposition elite’s prior experiences [Osęka 2021].

The dataset and the network analysis application presented herein, therefore, break important new ground in Polish studies by including both government-affiliated and opposition groups in its analysis. To our knowledge, scholarly study of government-affiliated individuals at the Round Table is quite limited. The study is also novel in its scope, taking a longer view of the formation of the Round Table elites by covering the whole post-war period, and incorporating a wide variety of affiliations rather than relying on a predetermined set of known groups. The insights about data gathering and data cleaning below, as well as the creation of a new purpose-built visualization application for the dataset will be useful for scholars working beyond the confines of Polish history.

2. A new dataset for longitudinal social network analysis

From February to April 1989, 567 individuals participated in the RT negotiations, including 320 government coalition representatives, 196 opposition figures, 47 non-aligned experts, 3 Catholic church observers, and 1 observer from the International Labor Organization (ILO). The opposition figures were drawn primarily from Solidarity groups, particularly the Lech Wałęsa-led Citizen's Committee. The government coalition was more heterogeneous in some ways, drawn primarily from PZPR members and Party structures, but also including SD, ZSL, and PAX members, as well as representatives from the government sanctioned union (All-Poland Alliance of Trade Unions, OPZZ). Many experts — considered not aligned with either the government or opposition — came from academia. Representatives from the Catholic Church were viewed by all sides as essential mediators necessary to gain public credibility for the process.

11

The team decided to follow each RT participant through the organizations they joined and left from 1945 to 1989: where they were educated, where they worked, the government and opposition leadership bodies they joined, the professional organizations to which they held memberships, the periodicals to which they were connected, and the events (strikes, protest statements, or earlier rounds of negotiations) in which they participated. We termed these connections “institutional affiliations” (IAs) and compiled them for each RT participant from their teen years up to February 1, 1989. Each IA includes a start date and end date, creating a rich longitudinal dataset.^[2]

12

We took a structuralist approach when creating the network, based in the belief that reality is socially constructed and that “identities and interests are conceptualized as processes evolving through a structuration process” [Antoniedes 2003] Although influenced by international relations theories about epistemic communities [Haas 1992] [Cross 2013], it is perhaps best to think of IAs as “thought collectives,” a term coined by Ludwik Fleck in the 1930s. He defined a thought collective (Denkkollektiv) as “a community of persons mutually exchanging ideas and maintaining intellectual interaction.” As the *Stanford Philosophical Encyclopedia* explains:

13

Members of that collective not only adopt certain ways of perceiving and thinking, but they also continually transform it — and this transformation does occur not so much “in their heads” as in their interpersonal space. It is easy to observe this phenomenon in everyday life. When a group of people speak about something important, they start to speak about things which would not cross their minds if they were alone and which they would not tell if they were in another group of people. There arises a thought style characteristic for that group. There also arises a certain collective mood which straightens up the ties among the group members and inclines them to act in a certain way. [Sady 2025]

Thus, our approach is not focused on demographic similarities, a common approach for elite network analyses [Keller 2018] [Comsa et al. 2016]. We do not link all RT participants who worked in steel mills or those who pursued post-secondary education. While there is certainly some commonality in the experience of going to any college or working in the steel industry, we did not judge this significant enough to be considered a thought collective. But, we do link all students and faculty who worked and studied in the same faculty and at the same university (see the discussion of umbrella groups and sub-groups below). Faculties and universities have intellectual cultures that differ from campus to campus. The Faculty of Law at the Catholic University of Lublin is a different intellectual and information environment than the Faculty of Law and Administration at Warsaw University.

14

Our approach is also not focused on whether RT participants had a high likelihood of meeting, unlike digital humanities projects in literature that create networks connecting characters who share words on the page [Moretti 2011]. Depending on the size of an IA's real-world membership, being part of the same IA might indicate a high likelihood that two people were in close physical proximity to one another and met. Physical institutions, like universities or government offices can form thought collectives, but so can more abstract groupings like political parties where physical proximity or the chance of meeting face-to-face might be minimal. Being part of the same protest movement is not important because of the possibility of meeting, but because these actions demonstrate some shared commitment to ideals and perspectives.

15

We are ultimately concerned with the circulation of ideas and have created IAs with the intention of mapping the thought collectives people joined and left. The IAs explained below are included as means of understanding the intellectual communities and information environments that shaped RT participants and that they, in turn, shaped.

16

2.1. Types of institutional affiliations

The groups, or institutions, that RT participants can be connected to come from a number of different categories. This includes:

17

- University faculties and other educational groups, like research centers run by the Polish Academy of Sciences (PAN).
- Places of work, like factories, universities, collective farms, medical facilities, law offices, or local, county, or national government offices.
- Unpaid positions, including charitable or humanitarian groups typically connected with the Church, as well as groups that were part of “independent society” or oppositional culture—groups like KOR, KIK, other temporary salons and discussion clubs, or artistic collectives.
- Relationships with particular periodicals (both government sanctioned and *samizdat*) through employment, editorial work, or regular contributions.
- National professional groups (like the Association of Polish Journalists, for example) or international professional associations (like the European Physical Society).
- Connections with local, regional, and national government leadership bodies, for example PRON, Party leadership groups, or

Central Committee offices. Opposition leadership bodies at all levels were also considered forms of government, despite their unofficial and sometimes illegal status.

- Membership in the Independent, Self-Governing Trade Union “Solidarity” and/or various political parties (including the PZPR, SD, SZL, and PAX).

Outside of these connections to organizations, the team also cataloged RT participants’ connections to more ephemeral “events.” This includes:

- Participation in strikes, like the 1968 student marches or the 1970 Baltic Coast strikes.
- Participation in negotiations between the Party and the opposition, like the Gdańsk Accords.
- Signatures on protest statements, primarily open letters to the government.
- Time spent interned as a political prisoner.

In total, the set includes over 2,700 distinct institutions, groups, or events to which RT participants were affiliated.

2.2. Sources

The information in this dataset was collected from a variety of published and archival sources in Polish. The overwhelming majority of these sources were analog. No pre-existing collections of metadata were utilized or enhanced. The data collection process took over a decade of site visits and manual collation. The full list of RT participants and their affiliations (opposition, government, or neutral) was compiled based on contemporaneous documents, specifically a guide put out by the opposition group introducing the public to its representatives [Adamiecki 1989]. A starting point for research into historical IAs was *Kto Jest Kim w Polsce*, a biographical directory published in Warsaw in different editions in 1984, 1989, and 1993 that includes the birthdates, profession, educational history, work history, and professional associations memberships for well-known Poles [Kto jest kim w Polsce 1993]. The team also incorporated various published sources on the political opposition, including the *Opozycja w PRL: Słownik Biograficzny 1956-1989* (The Opposition in the PRL) [Skorzynski 2009] series and the *Encyclopedia Solidarności* (Solidarity Encyclopedia) website [Encyklopedia Solidarności n.d.]. Together these two sources provided encyclopedia-style biographical essays on nearly all of the Solidarity-affiliated RT participants, the Church representatives, and many of the opposition-adjacent experts.

Tracking down biographical information for the government-coalition side of the RT talks proved more difficult. Although [Adamiecki 1989] provided a complete list of RT participants, it did not include full biographical entries for the government-affiliated RT members. Tadeusz Moldawa’s book, *Ludzie władzy 1944–1991* [People of Power 1944-1991] [Moldawa 1991] proved exceptionally helpful, as did various government-created websites for *Sejm* and *Senat* members. The team also accessed analog PZPR Central Committee personnel files maintained at the *Archiwum Akt Nowych* [Archive of Modern Records] in Warsaw. These files provide very detailed information on education, work histories, political memberships, professional affiliations, and roles within the Party and the government. The *Instytut Pamięci Narodowej Biuletyn Informacji Publicznej* [Institute of National Remembrance Public Information Bulletin] provides detailed information about political party membership, youth group membership, and connections to local, regional, and national organizations of the PZPR and its coalition partners.

In some cases, we tracked down biographical entries in local who-is-who type biographical encyclopedias and in author’s notes in publications. We also searched for biographical information on university websites, obituaries, or memorials published online as well as the Polish-language version of Wikipedia. In some circumstances, the team contacted institutions like university departments or NGO offices directly for information on their former employees.

To our knowledge, this dataset represents the first attempt to fully digitize the activities of the RT participants in the second half of the 20th century.

2.3. Network structure

In its basic form, these data can be represented as a longitudinal bipartite network: One group of nodes (the individual Round Table members) have edge connections to another group of nodes (specific organizations, institutions, groups, and events), representing whether that individual was an active participant or member in the organization or event at particular moments in time [Asratian, Denley, and Häggkvist 1998]. However, since our aim in this study is to understand evolving relationships between RT members, we instead represent the data as a relational network, where the nodes represent individuals and edges represent shared membership in an organization or institution [Banerjee, Jenamani, and Pratihari 2017]. Edges are weighted according to the number of shared organizational or institutional affiliations between two nodes. Thus, for any given point in time, a set of two nodes with three connections would be more strongly linked than a set of two nodes with only one connection. (The mathematical representation of this graph structure can be found in Appendix 1.)

As an illustrative example, in Figure 1 below, the two highlighted nodes represent Jan Turowicz and Jan Józef Szczepański. These individuals have an edge connection of strength 1, because during the month of April 1953, they were both affiliated with *Tygodnik Powszechny*. The layout of this network visualization places strongly connected nodes closer to each other and unconnected nodes further apart. As such, apparent clusters in the network visualization represent closely connected groups; for example, in Figure 1, the large clusters are created by shared memberships in the PZPR, Warsaw University, and Communist youth groups.

Apr 15, 1953

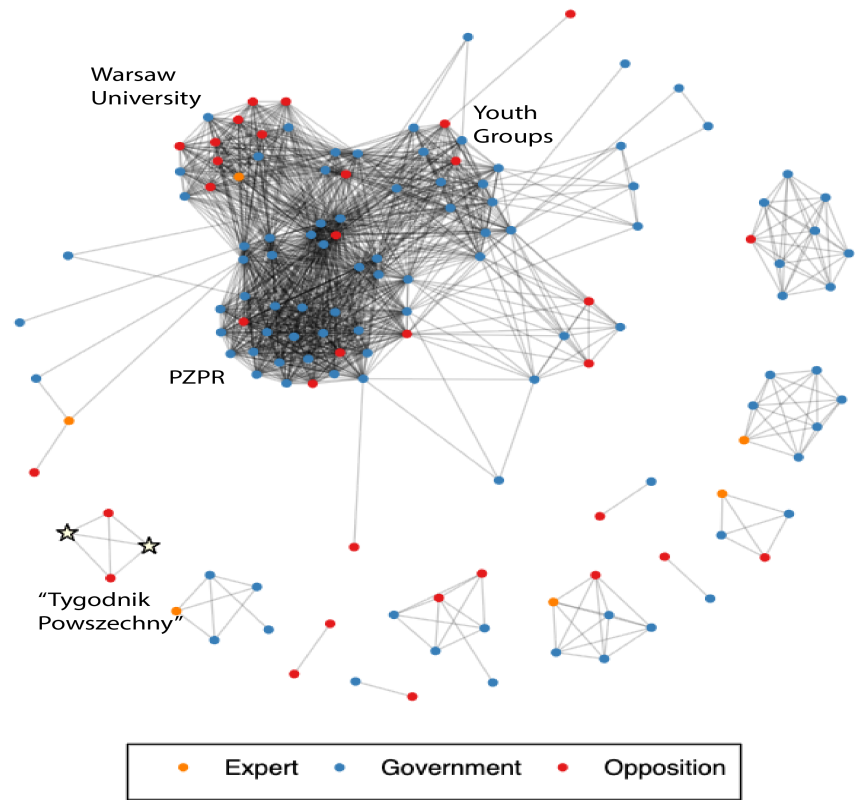


Figure 1. Poland Round Table participants network as of April 1953, with Jerzy Turowicz and Jan Józef Szczepański highlighted.

The primary function of the *PolandRoundTable* app described in Section 3 is to allow users to dynamically generate network visualizations like Figure 1 above, on any user-chosen date between January 1, 1945, and February 1, 1989, just before the RT negotiations began.

2.3.1. Defining edge set scope

One appealing aspect of this data, in the context of longitudinal analysis, is that the node set is fixed; at any particular network snapshot in the studied date range, the nodes are made up of the 567 Round Table attendees. However, the question remained of how to define a consistent scope for edge connections. We chose to define the second side of the bipartite graph — i.e. the edge connections in our network — as Institutional Affiliations (IA). To qualify as an IA, an event or organization needed to have:

- 1. A measurable start and end date. We restrict ourselves to continuous affiliations or one-time events. For example, attending a university has measurable dates of enrollment and graduation, and attending a specific one-day conference is limited to that single day, but being a regular campus visitor does not have a clear beginning and end.
- 2. A limited, well-defined group of members or participants. We do not consider affiliations that cannot be said to have a “membership list” of some variety. For example, formal registered membership of a political party is an IA; but a general tendency to vote with said party is not.
- 3. A potential relevance to the 1989 Round Table. We interpret “potential relevance” liberally; many organizations that were not explicitly academic or political played important roles in the cultural lead-up to the revolution, such as churches and publishing houses, or cultural and artistic pursuits.

One consequence of our definition was that public opinions of the RT participants were not considered to be IA connections in and of themselves, unless the opinion manifested in a specific group event or organization. For example, while many RT participants presumably supported factory workers strikes in Radom and Ursus in 1976 — and perhaps even made publicly recorded comments in this regard — we do not consider “public support” to be a well-defined group. However, we do include in the IA dataset a public letter from 1976, signed by 14 people, of which 10 were eventual Round Table attendees.

Another major consequence was that personal connections were also omitted from the IAs. This choice is potentially controversial; certainly, we do not deny that personal relationships massively influenced the connections between individuals at the Round Table. We omit them nonetheless for two reasons:

- 1. **Availability of reliable historical data.** While relationships like marriages or family connections may be documented, it is unrealistic to expect an unambiguous measure of friendship from primary sources that could be located for all 567 individuals.

2. **Lack of start and end date definition.** When does a first meeting become an enduring connection? When does a friendship fade? These were questions for which we were not comfortable defining our own subjective answers. 30

Ultimately, we opted to define our network in a way that minimized a need to impose our own interpretations of historical sources. This required limiting our edge scope to unambiguously recorded, time-limited affiliations of civic relevance. We acknowledge that our analysis, therefore, cannot be said to capture interpersonal “who knows who” connections, as social networks typically do. Rather, we consider IA connections to represent thought collectives created through shared lived experiences, overlapping societal initiatives, joint public endorsements, and so forth. 31

2.3.2. Larger umbrella groups with smaller subgroups

From the outset of the project, we were well aware that IAs could exist on radically different scales: for example, one IA was a protest letter signed by only three people, while another was PZPR, the national Communist Party, with millions of members. We do not view these differences as inherently problematic, as ultimately both small and large IAs can reasonably be said to represent a thought collective. In keeping with our goal of limiting subjectivity in the data, we opted not to invent an importance metric for IAs by which to weight edges. 32

That said, it quickly became apparent that nested IAs needed careful treatment. Consider, for example, university faculty: Should being at the same university represent an IA connection, or being in the same specific department? We determined that in these cases, membership in the umbrella group (e.g. a university) and membership in the subgroup (e.g. a faculty or department) both separately met our requirements for IAs. As such, we effectively treated these as separate IAs; two individuals at the same university but separate faculties would have one edge connection in the network, while two members of the same faculty would have two edge connections. 33

Section 2.4 provides more detail on how umbrella groups and subgroups are recorded in the dataset, and Section 3.1.1 shows how the Shiny application contains options to treat these nested scenarios differently if desired. 34

2.4. Overview of final public datasets

The final Poland Round Table data as represented in this paper can be found in csv form in [Domber 2023], or as part of the *PolandRoundTable* R package [Bodwin 2023]. We also maintain a publicly available Google Sheets document of the data at bit.ly/polandroundtable, which will remain the most up-to-date version of the dataset in the event that mistakes or additional information are identified in the future. 35

The data bundle is structured in the form of three tabular datasets: 36

2.4.1 Affiliations and dates

This is the primary dataset needed for analysis. It contains a record of each unique affiliation of a Round Table individual to an IA, and the start and end dates of that affiliation. Individuals (“Members”) are identified by unique IDs starting with MEM, and IAs (“Organizations”) are identified by unique IDs starting with ORG; primary names for both members and IAs are also included for ease of reading; however, it is recommended to use the ID columns for analysis. Additional information includes the eventual Round Table affiliation of the member, the Umbrella and Subgroup labels of the IA (if applicable), and the type of IA (long-term “Organization” or one-day “Event”). 37

Full.Name	Member.ID	RT Affiliation	Organization	Org.ID	Start.Date	End.Date
Sylwester Zawadzki	MEM0487	Government	Ministry of Justice	ORG01053	1981-06-12	1981-11-22
Zenon Jankowski	MEM0510	Government	Ministry of Justice	ORG01053	1979-02-01	1989-02-06
Andrzej Cudala	MEM0507	Government	Ministry of Justice	ORG01053	1983-11-01	1988-01-01
Marcin Król	MEM0104	Opposition	Dziekania Political Thought Club	ORG00358	1984-01-01	1989-02-01
Józef Musioł	MEM0523	Government	Ministry of Justice	ORG01053	1983-02-01	1989-02-06

Table 1. Dataset snippet: Institutional affiliations and dates.

2.4.2. Individual biographical information

This tabular dataset includes names and demographic information for each Round Table individual. The Member.ID key matches to the same column in the primary *Affiliations and Dates* data table. This data table may be used for follow-up analysis of member behavior based on age, gender, or profession. We also envision the possibility of adding further demographic information, such as educational and socioeconomic 38

background (i.e., *inteligensia* vs *working-class*) or geographic origin similar to the work by Maria Comsa, Melanie Conroy, and others to create enhanced meta data about individuals connected to the French Enlightenment, what the authors called “Procope” [Comsa et al. 2016].

Member.ID	First Name	Last Name	Age	Gender	RT Affiliation	Profession
MEM0104	Marcin	Król	44	M	Opposition	Journalist
MEM0487	Sylwester	Zawadzki	67	M	Government	Academic Law
MEM0507	Andrzej	Cubała	45	M	Government	Lawyer
MEM0510	Zenon	Jankowski	52	M	Government	Jurist
MEM0523	Józef	Musioł	56	M	Government	Lawyer

Table 2. Dataset snippet: Individual biographical information.

2.4.3. Group and organization meta information

This part of the dataset includes names, details, and alternate names for each Institutional Affiliation. The Org.ID key matches to the same column in the primary *Affiliations and Dates* data table. This data table is currently primarily used as a reference for additional data gathering; for example, for determining if two similarly named organizations are equivalent. Like with the *Member Meta* dataset, we also envision the possibility of adding further IA details, especially geographic information, to allow for geospatial analysis of the Round Table networks.

38

Org.ID	Name	Umbrella	Subgroup	Type	Alternate Names
ORG00085	Association PAX Publishing Institute	APAX	IW	Political Party Leadership Body National	
ORG00358	Dziekania Political Thought Club	DPTC		Salon	
ORG00675	Institute of Judicial Legal Research	IJLR		Research Institute	
ORG01053	Ministry of Justice	MINJUS		Government Agency National	Ministerstwo Sprawiedliwości
ORG02333	Warsaw University Institute of Pedagogy	UW	IPed	Postsecondary School	

Table 3. Dataset snippet: Organization and event information.

This dataset includes a few pieces of demographic information that are duplicated in the member-list and IA-list datasets (Tables 2 or 3 above): the members’ full names, the IA names, and the RT Affiliation of the member. This information could instead be restricted to Tables 2 and 3, and then be joined to Table 1 via the Member.ID and Org.ID keys. However, we duplicate it for reasons of computational speed and accessibility: Users may explore Table 1 without technical knowledge of dataset joining, and the code underlying the *PolandRoundTable* can avoid repeating computationally costly joins. Outside of these three duplicated columns, our collection of three datasets follows standard relational database modeling principles [Codd 1990].

39

Ultimately, we hope that by gathering, cleaning, and carefully structuring these data for public consumption, we will facilitate further quantitative research into the Round Table community, as well as provide a novel and well-organized data source for educational and methodological ventures in longitudinal network analysis.

40

2.5. Challenges and limitations of the dataset creation

This dataset was assembled by hand over many years from analog and first-person sources, and as such, we encountered many challenges in cleaning and formatting the data into a consistent and accurate structure. In this section, we document these challenges and how we chose to address them, to provide full transparency for users of the Round Table Dataset.

41

2.5.1. Organizational name changes and translations

Some universities, colleges, and academic faculties changed their official names over time, as did a number of government ministries. For example, the Polish ministry that oversaw higher education changed their official name multiple times from 1945 to 1989, going from *Ministerstwo Szkolnictwa Wyszego* [Ministry of Higher Education] to *Ministerstwo Nauki, Szkolnictwa Wyszego, i Techniki* [Ministry of Science, Higher Education, and Technology]. For the sake of consistency and simplicity, we utilized standardized names for entities like the Ministry of Higher Education over the entire period, with a single Org.ID number to uniquely identify the entity. However, in instances when name changes are not just superficial but reflect meaningful differentiation generally recognized by the historical community — as when the Workers’ Defense Committee (KOR) became the Committee for Social Self-Defense KOR (KSS-KOR) — a new organization and separate Org.ID was created.

42

As with the creation of any dataset, subjective decisions were made. In each case, we exercised expert knowledge of Polish history and Polish institutions. If there was any conflicting information in the source materials, the team again utilized its professional judgment to determine which date was most logical and consistent with other information.

43

2.5.2. Missing dates

Personnel files from our analog sources often included month- or day-specific information, but many of the biographical encyclopedias only mention the years that someone joined or left a group. In these cases, we created specific dates for IAs based on logical assumptions. For university and educational connections, it was assumed that these affiliations began on 9/01 and ended on 6/30. If someone left one job and joined another in a specific year, the year was split with the end of employment happening on 6/30 and new employment beginning on 7/1. If an individual was attached to a professional association or political party, membership was assumed to begin on 1/1 and end on 12/31. Unlike employment information or educational affiliations, professional association memberships are allowed to overlap. When the founding or disbanding dates for a specific organization — like KOR or a specific session of the *Sejm* — are known, IAs were coded to reflect those specific dates. If a RT participant’s membership in an organization was tied to a specific national event — like the declaration of martial law on December 13, 1981, which lead to changes in political party affiliation — this date was used in that individual’s IA, even if the official date might have been later. Therefore, there might be slight artificial spikes in shared IA memberships on certain dates, based on the assumptions made.

44

2.5.3. Event-based connection duration

Since our study is longitudinal in nature, spanning over 40 years of history, we needed to be able to “snapshot” which IA connections were active between individuals at any given moment in time. From a historical perspective, it did not seem sensible to take a strict interpretation of the start and end date for one-day events, such as strikes or protests. Although such events meet IA Requirement 1 — they have a well-defined start and end date, namely, the same day — we do not believe their duration as a shared experience is limited only to that day.

45

In the provided dataset, the true one-day start and end dates are recorded. However, in our own analyses of this data, we choose to regard Event-type IAs as enduring for a full month. In the public Shiny app described in Section 3, we allow the user to select how long an event-type IA is considered to endure; we encourage users to make deliberate choices in how they analyze these important single-day moments in Polish history.

46

3. A custom Shiny app for network exploration

A common theme in this cross-disciplinary project was the iterative nature of applied data science: Data insights lead to new questions about historical processes, which in turn produced new quantitative questions. Ultimately, we believe that data science has the power to contribute not just results from targeted analyses, but also new tools to facilitate exploration for researchers and domain experts.

47

To this end, our second contribution in this work is a custom app, where researchers can interactively visualize and assess social network connections between Round Table Members over time. This app can be accessed by installing the R package *PolandRoundTable* [Bodwin 2023] and then running the function `PolandRoundTable::run_network_app()`.

48

The team built an app using R, rather than relying on dedicated network visualization software such as Palladio or Gephi, to allow for dynamic data filtering choices prior to network construction. The data input required for Palladio, Gephi, and similar tools is an edge and node list for some existing network structure [Edelstein et al. 2017] [Bastian, Heyman, and Jacomy 2009]. While this data can be filtered or manipulated prior to visualization, such operations act on the edgelist dataset. In our study, the core source data is the IA affiliation timespans for each member, which is not yet in network (edgelist) format. When the user selects a date (and possibly other data subsetting options), the data is limited to connections active on that date, *then* a node and edgelist is constructed from the limited data. In other words, the data subsetting steps required for this study operate one level removed from the data input expected by Palladio, Gephi, and the like. For this reason, we were required to use a scripting language like R, Python, or JavaScript to build a custom tool. We chose R for the robust *Shiny* ecosystem [Chang 2021] and the availability of the *igraph* [Csárdi et al. 2024] and *plotly* [Sievert 2020] packages for network layouts, visualizations, and metric computation. A peripheral advantage of our purpose-built approach is the ability to alter details of the app layout and functionality without restriction.

49

In what follows, we give a brief overview of some of the main structure and design features of the app; then in Section 3.2 we provide some historical insights generated from the app visualization abilities.

50

3.1. App structure

The *PolandRoundTable* app uses the *Shiny* R package and its peripherals [Chang 2021] [Chang et al. 2024] [Perrier, Meyer, and Granjon 2024].

51

Data manipulation is performed using the *tidyverse* package suite [Wickham et al. 2019]. Network layouts are primarily calculated using the *igraph* package [Csárdi et al. 2024] and plotted using *plotly* [Sievert 2020], with small elements from other network graphing packages [Gohel and Skintzos 2024] [Pedersen 2024] [Schoch 2023].

3.1.1. Dataset choices

Although the *PolandRoundTable* App was initially conceived to answer our own research questions, it was a priority from the outset to create a tool that might facilitate a broad spectrum of research. As such, we chose to offer the user a high level of control over not just the visual elements of the network plots, but also over the underlying data from which the networks are constructed.

The first landing page of the app therefore consists of *dataset* choices that are made prior to the construction of the network:

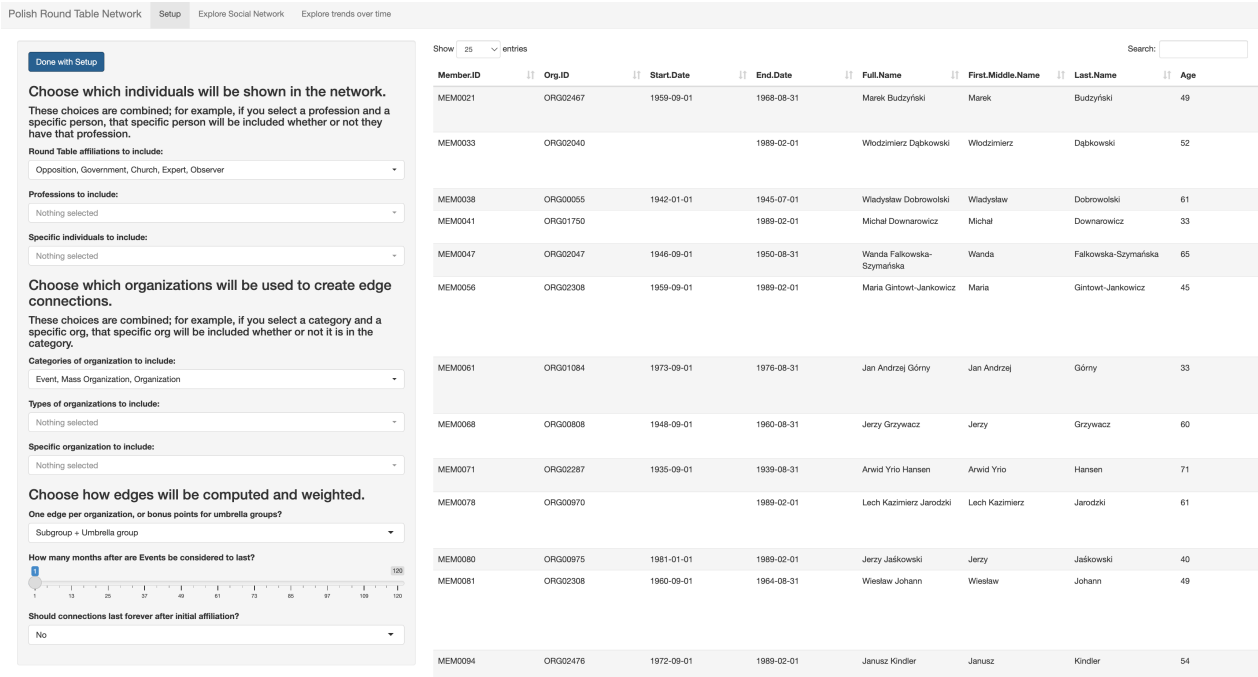


Figure 2. Screenshot of the PolandRoundTable app landing page, where initial data decisions are made.

Through the drop-down and radio-button options, the user can tailor the data to their needs. For example, a researcher may choose to study only the Opposition side of the Round Table meetings, and would therefore omit all Government, Expert, Church, and Observer class individuals.

One notable choice here is the decision about how to handle *Umbrella Organizations* (as described in Section 2.3.2). By default, edges are identified based on *both* Umbrella groups and Subgroups, so that two members who are in the same smaller IAs that is a subset of a larger organization — for example, two individuals active in the same regional branch of NSZZ — are considered to have an edge connection of weight 2.

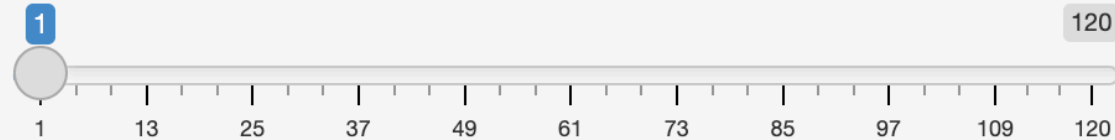
Another notable pre-graph decision is how to regard *Event* type IAs, as described in Section 2.5.3. By default, Events are considered to “endure” as active connections for one month (30 days) after the day they occur. However, a particular user might choose to take a different perspective on the role of these one-day occurrences, and so this choice is left fully modifiable in the app. Users can also opt to define *all* IA connections as enduring; that is, once two individuals share an institutional affiliation, they are considered to have an edge connection in the network *ad infinitum*, instead of the edge terminating when one is no longer affiliated to that IA.

Choose how edges will be computed and weighted.

One edge per organization, or bonus points for umbrella groups?

Subgroup + Umbrella group ▼

How many months after are Events be considered to last?



Should connections last forever after initial affiliation?

No ▼

Figure 3. Close-up of data setup options pertaining to network edge definition.

3.1.2. Visualization choices

After confirming all data decisions, the user moves to the visualization tab of the app. Here, the network graph can be visualized for any choice of date.

57

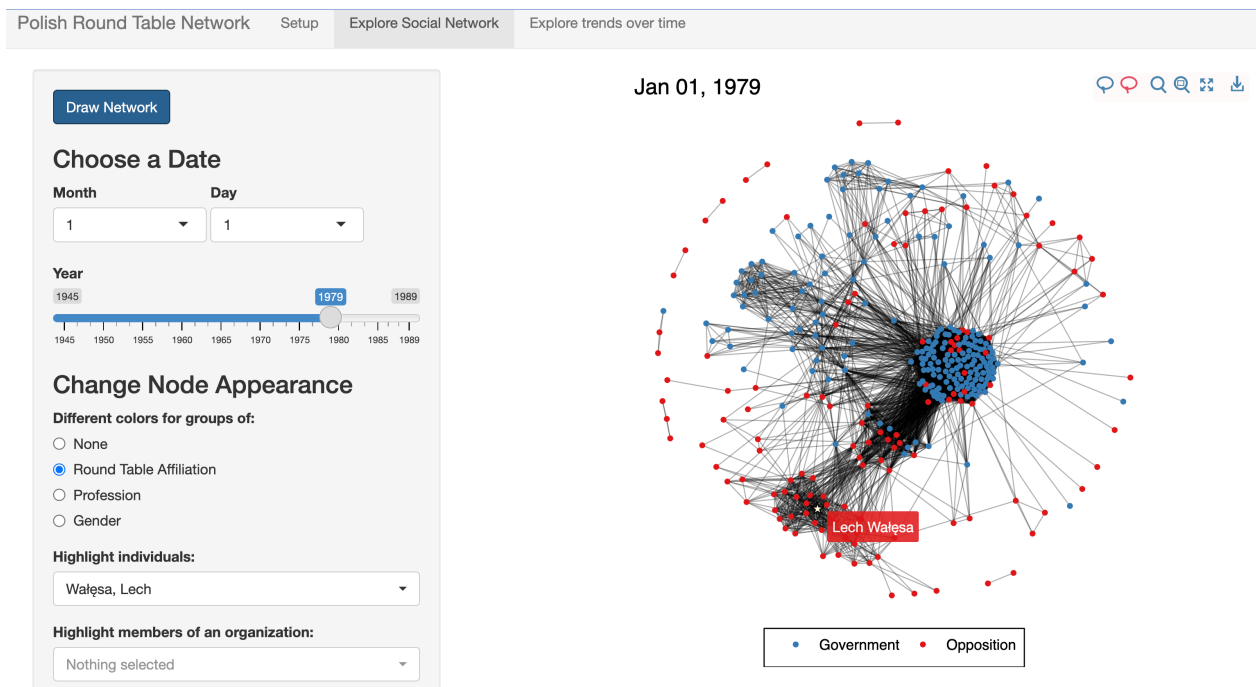


Figure 4. Screenshot of the PolandRoundTable app visualization page, where network structure is displayed for a chosen date.

Choices here are primarily aesthetic: Users may choose to color nodes by Round Table Affiliation, occupation, or gender; and they may choose

58

to highlight one or more nodes of interest. In Figure 4, we have highlighted *Solidarity* leader Lech Wałęsa and colored nodes by Round Table Affiliation, showing Wałęsa's central position within the Opposition movement. It is worth noting that nodes may be highlighted using the drop-down menus *or* dynamically, by clicking a node or click-and-drag selecting a group of nodes. Selected highlighted nodes retain their selection across changes to the date, so that individuals of interest may be easily tracked in the network over time.

The visualization window is also interactive to ease exploration. When a user hovers over a node, the Member name is displayed. When a user hovers over an edge, the Organization name is displayed. So, by moving over the network, users can quickly determine which Organizations are creating clusters and who is part of the cluster. For clusters that are more tightly packed, there is a Zoom function which allows for easier visual exploration of specific areas in the overall network. The visualization window also allows users to easily create and save the visualization (as a .png file) for any particular date.

3.1.3. Faster layout update

In this paper, we primarily omit the technical details of the app creation. However, we wish to make note of an important back-end design choice: After the initial creation of the node layout, subsequent layouts for new date choices update the previous network visualization, rather than re-creating the network visualization from scratch.

The main reason for this architecture is consistency of visualizations. Typical network layout algorithms — including the one used here, that of [Fruchterman and Reingold 1991] implemented in [Csárdi et al. 2024] — begin with a random assignment of nodes to locations in space and then iterate to a stable convergence that places more connected nodes closer together. This means that, due to the initial random locations, two visualizations of the same network may result in layouts that are mathematically identical but look different to the human eye.

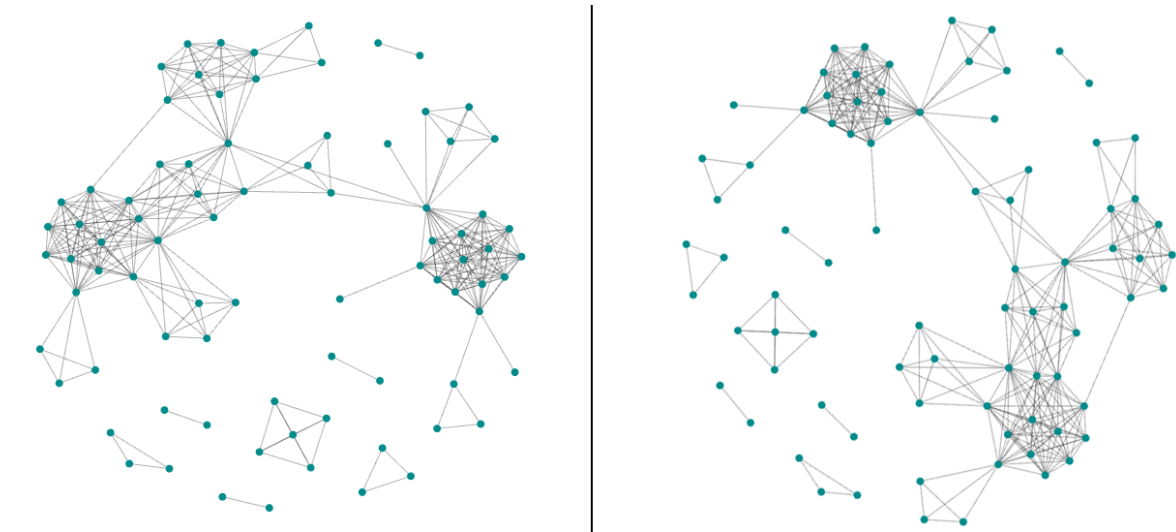


Figure 5. The same network (Round Table, Jan 1948), with two different possible visualization algorithm convergences.

By forcing subsequent network layouts to initialize with the previous node locations, we maintain consistency in the rotation of the network layout, allowing users to more easily visually compare structural changes over time. This approach also has positive consequences for computational speed of the visualization process, as the layout algorithms tend to converge more quickly with meaningful initialization than from random points.

3.1.4. Network Metrics

The third tab of the App allows users to observe trends in individuals' centrality within the overall network. Users choose between two mathematical measures of importance to the network structure: betweenness (a measure of the number of other pairs of nodes that are connected through a single node) and degree (the total number of connections a node has). Both of these metrics can be viewed in either raw form or normalized based on the growing complexity of the overall network. Users then select specific individuals to include, pick a start and end date, and can graph the results.

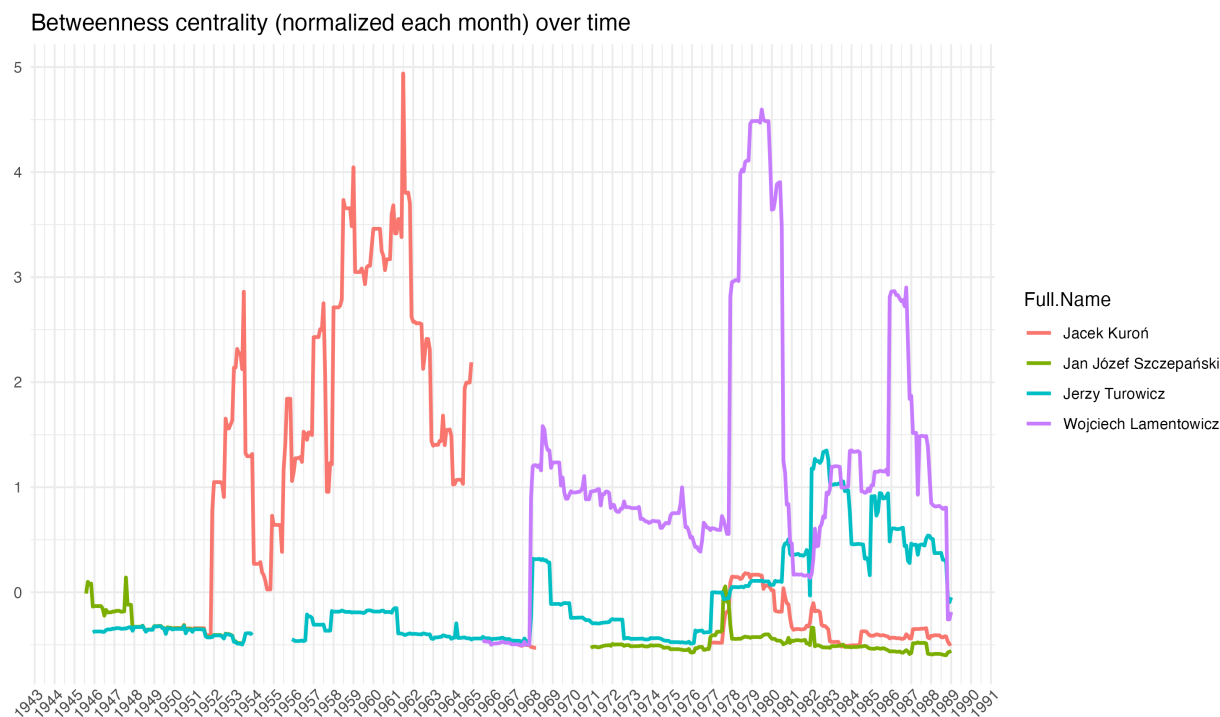


Figure 6. Plot of Normalized Betweenness Centrality for Jacek Kuroń, Jan Józef Szczepański, Jerzy Turowicz, and Wojciech Lamentowicz from Jan. 1945 to Feb. 1989, generated on the Explore Trends tab in the PolandRoundTable app.

These graphs are based on prepopulated calculations of degree and betweenness and reflect measures of the entire network, including all Round Table affiliations. These metrics do not reflect the data choices on the landing page. So it is not (yet) possible to graph centrality measures within the network of only the Opposition, or of only the Government and the Church.

Currently, there is also a third, experimental measure of node importance to the network, called Cross-Betweenness, which measures a nodes importance in connecting Opposition members with Government members. (This bespoke measure and its normalized version was created for a specific project of interest for Dr. Domber and may not be useful for general exploration of the network.)

3.2. Historical insights

The network visualizations created by the Shiny app provide a fascinating window into the transformation of this subset of Poland's elite in the post-World War II era, both allowing for analysis of the Opposition or the Government individually and providing insights into how interconnections between different constituencies shifted over a broad period. From 1945 to 1955, Communist youth groups create clusters, primarily because of the young age of future RT participants at that time (Figure 1, above). From 1945 onward, there is also consistently a cluster formed by PZPR membership, a reflection of the central role played by the Party in Communist society. Interestingly, the PZPR cluster remains noticeably mixed until the 1980s, including individuals who are on the Government side of the RT (blue) but also including meaningful numbers of those people later connected to Experts (yellow) and to the Opposition (red). (Figures 7, 8, and 9) Clusters connected to universities, like Warsaw University, are also quite mixed throughout, designating them as a shared space where future members of the Opposition delegation and future members of the Government delegation interacted. This is also a testament to the importance of Warsaw University as the training ground for Poland's elite, who end up at the Round Table negotiations.

While there is a small, loose Opposition cluster connected to the Catholic Intellectual Clubs (KIK) first identifiable shortly after the revolutionary events of 1956 (Figure 7) there is no obvious or dominant Opposition center or cluster this early. The same general pattern applies through 1967 (Figure 8). But, after student protests in March 1968 and the creation of illegal, civil society groups like KSS-KOR and Society for Academic Courses joining KIK, and the proliferation of samizdat publications in the second half of the 1970s, there is an evident resorting of society, with red and blue beginning to congregate in more segregated areas and the creation of a loose Opposition cluster (Figure 9).

The most consequential moment in the overall structure of the network, however, is the creation of the Solidarity trade union in late August 1980. The Opposition now has a massive, shared institution, creating a dominant Opposition cluster and reshaping the entire network, which now forms a "barbell" pattern with PZPR members and Solidarity members as the two weights (Figure 10). That barbell pattern remains throughout the rest of the decade. Interestingly, the PZPR and Solidarity clusters move further apart with the declaration of martial law in December 1981 (Figure 11), when Solidarity was declared illegal and its leaders were jailed. Over the course of the 1980s, the two ends of the barbell then slowly move back towards each other as the Round Table negotiations approach (Figure 12).

Both the persistent existence of a PZPR cluster and the creation of the barbell pattern after the founding of the Solidarity Trade Union confirm

existing historical consensus. If PZPR membership was not a central feature or a network reorganization was not evident surrounding the formation of Solidarity, it would lead us to question the historical relevance of the networks captured in the dataset.

Apr 15, 1957

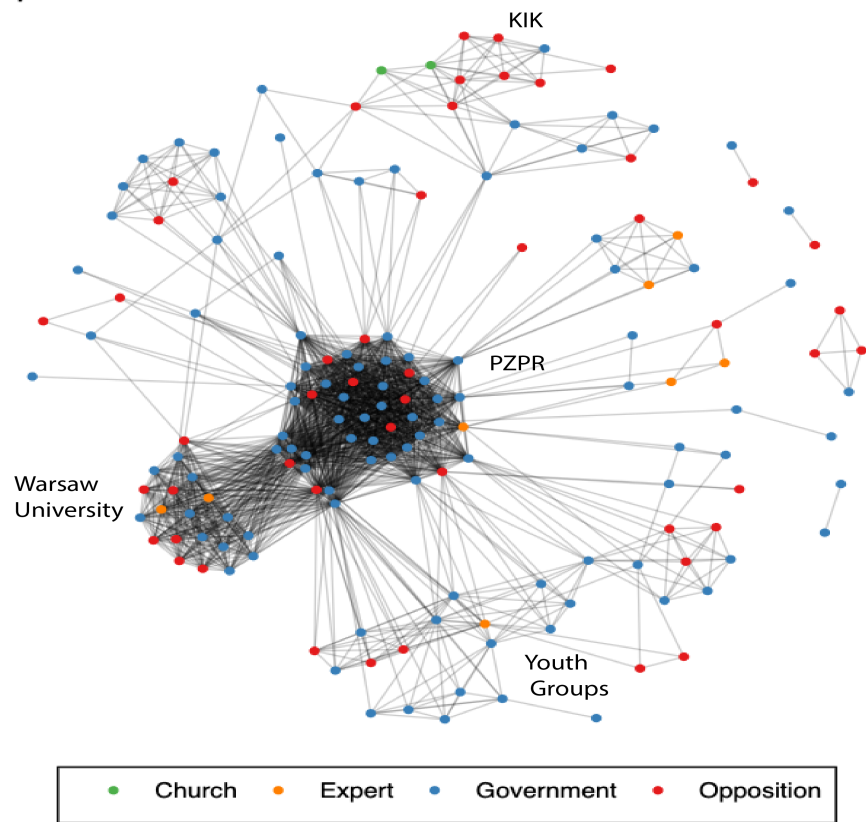


Figure 7. Polish Round Table participants network as of April 1957.

Apr 15, 1967

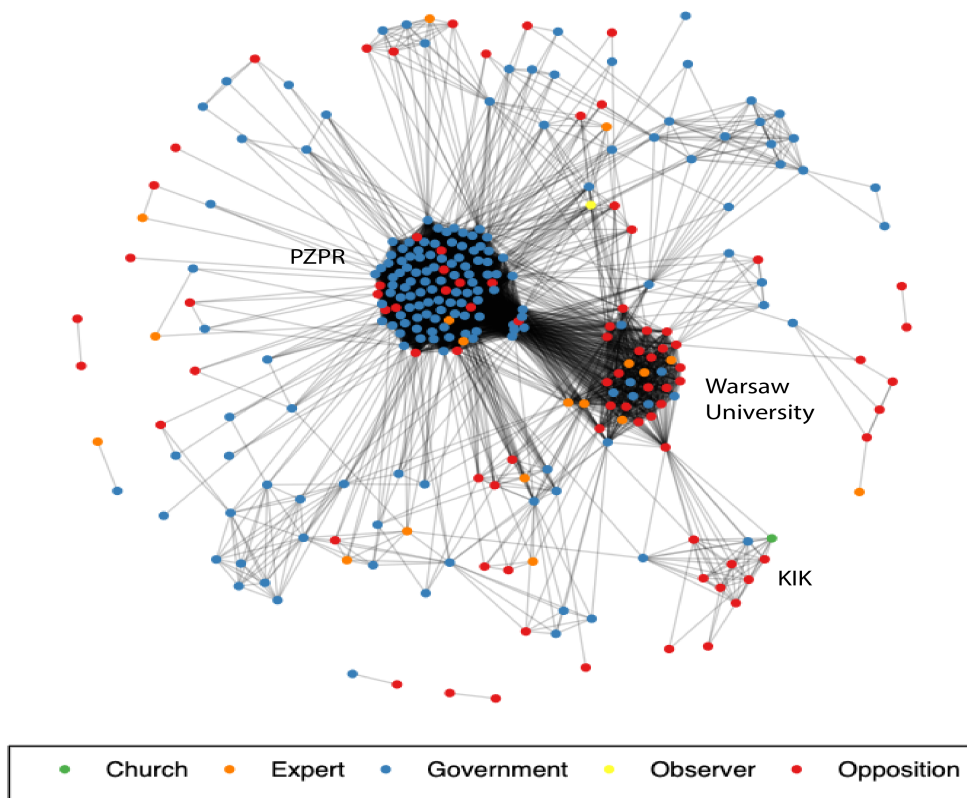


Figure 8. Polish Round Table participants network as of April 1967.

Apr 15, 1979

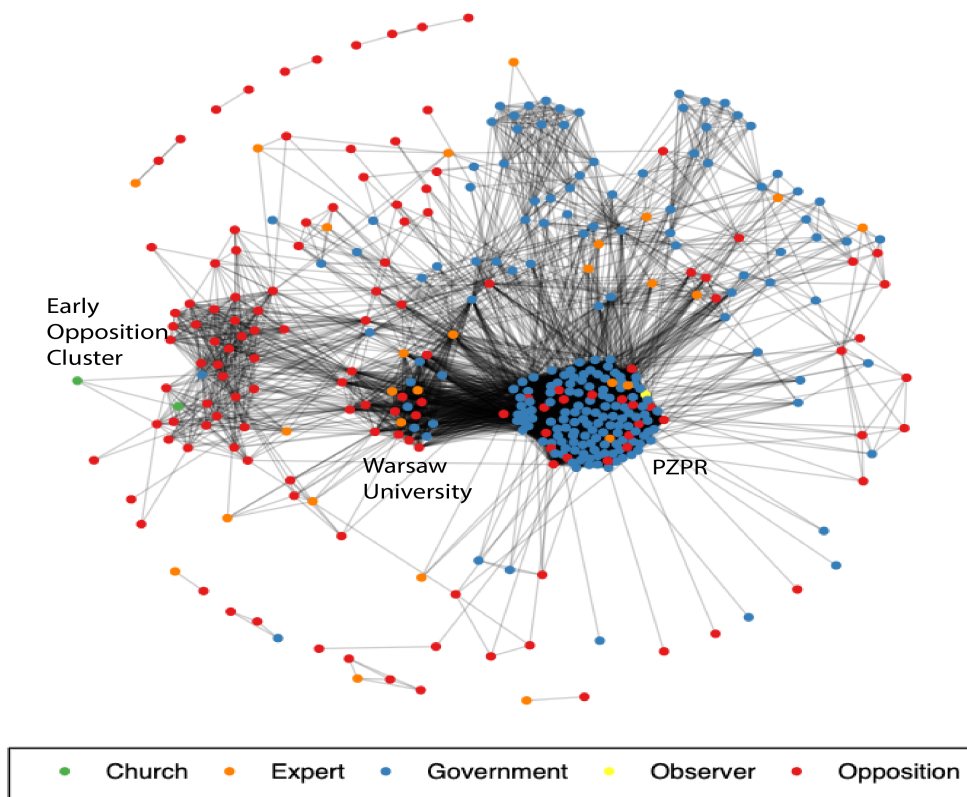


Figure 9. Polish Round Table participants network as of April 1979.

Dec 15, 1980

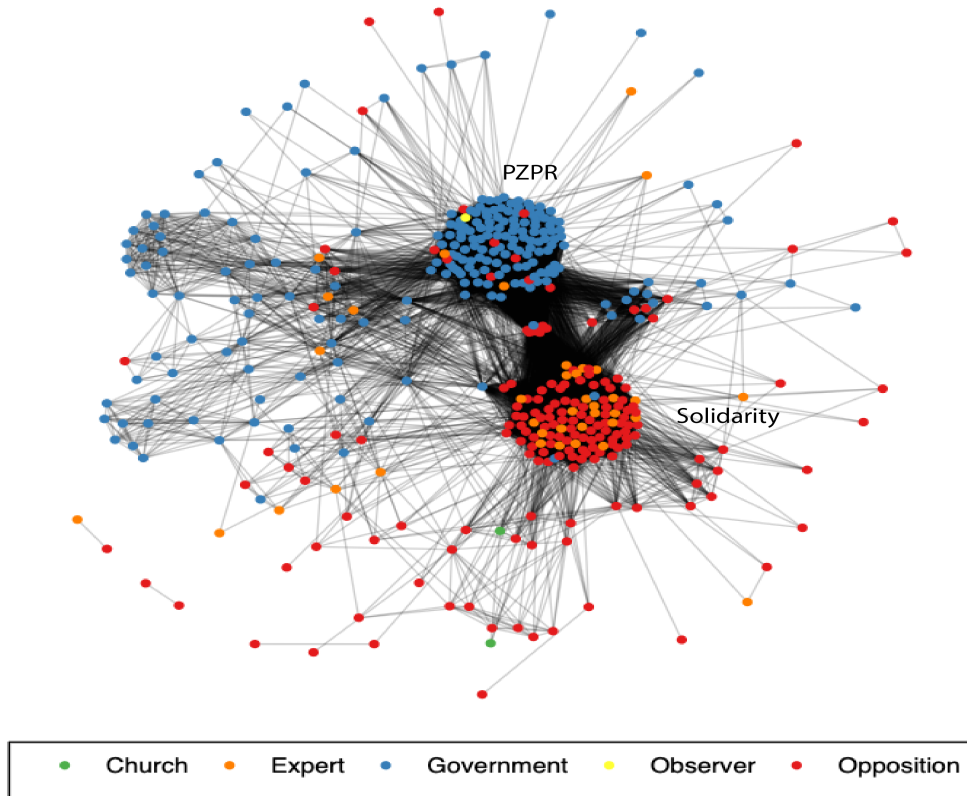


Figure 10. Polish Round Table participants network as of December 1980.

Apr 15, 1982

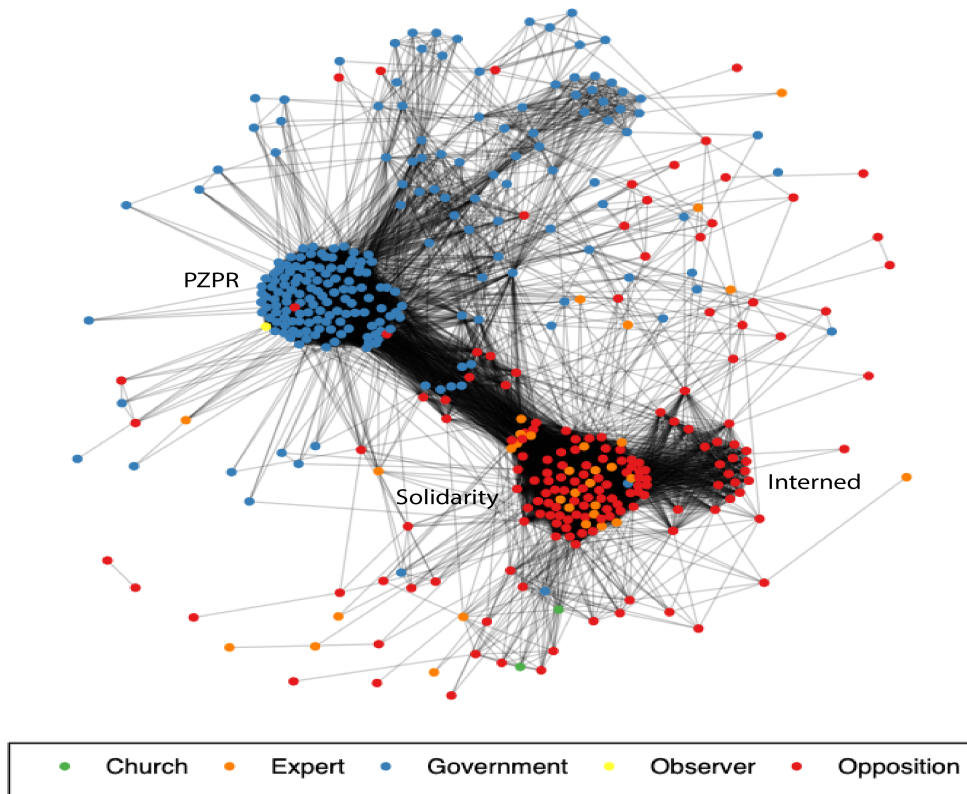


Figure 11. Polish Round Table participants network as of April 1982.

Jan 15, 1989

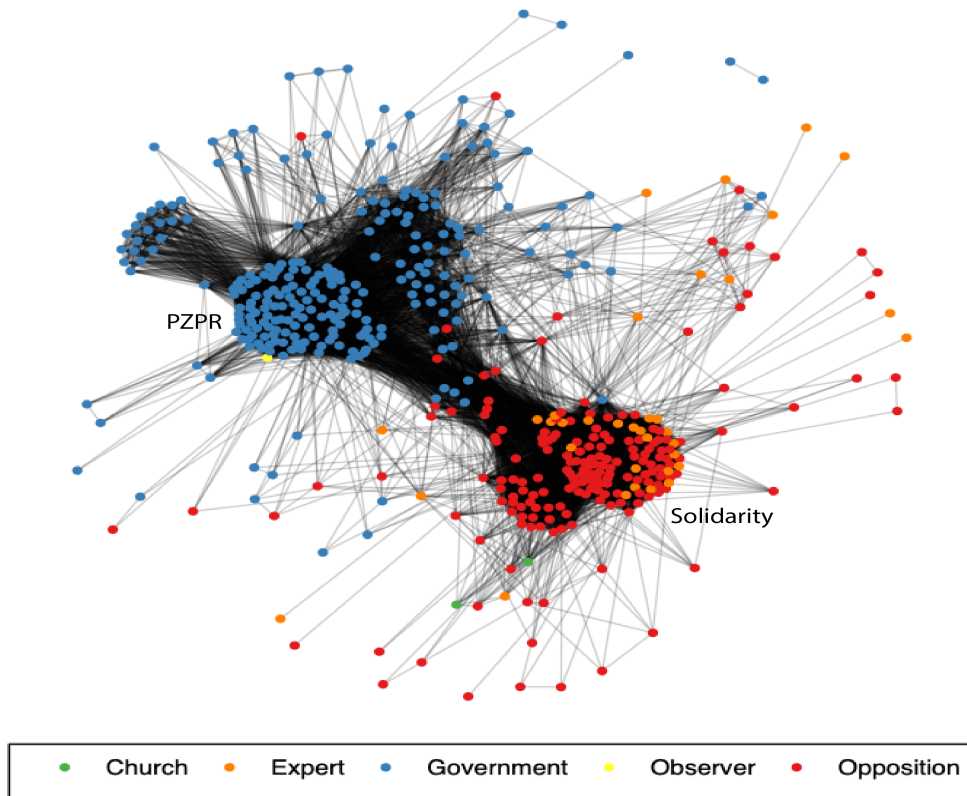


Figure 12. Polish Round Table participants network as of January 1989.

4. Predicting Round Table affiliations from IA shifts

The digitization of data allows a fresh perspective on commonly studied historical questions. Led by a trained historian and a statistician, this team is animated by the belief that “quantitative analysis can help to discover the overlooked example of a known kind, or an anomaly or outlier that may form the basis for a new case study or interest” [Ahnert et al. 2020, 75] In the case of the Polish democratic revolution, it is natural to investigate key moments in the political journeys of movement leaders that may have polarized their allegiance to one political stance or another. This inherently qualitative question can be translated to quantitative terms, in the context of the Round Table Dataset, via predictive modeling.

As an example of the new questions that can be asked with this kind of dataset, we decided to find out: Can institutional affiliations prior to the Round Table be used to predict an individual's final affiliation (“Opposition” or “Government”)? And, how do the insights from this predictive modelling confirm or refute existing scholarship and provide directions for further research?

4.1. Eras and Pivot Points

To specify a coherent model, we must limit the scope of predictor variables. We accomplish this by defining *a priori* “pivot points” in Polish history from 1945 to 1989, which divide the period into distinct eras. Prior to any data analysis, we identified from historical literature a list of significant events that are thought to signal turning points in the development of an opposition movement. These dates are:

- **June 1956:** Workers riot in Poznań and other cities, in response to the de-Stalinization crisis across the Soviet empire. The year prior to these events, the Club of the Crooked Circle salon is formed to openly address political questions of the day. Catholic Intellectual Clubs (KIK) are founded in the aftermath of these events as is the liberal Catholic periodical “Więź,” creating a space for discussion and criticism of Communist policies.
- **March 1968:** Students in Warsaw and across the country rise up to call for greater freedoms and social reforms, only to be repressed by the state. Scholars refer to the “Generation of 1968,” those younger people who turned toward opposition in the wake of these events.
- **December 1970:** Workers along the Baltic Coast go on strike in response to price increases and are brutally repressed by the military, leading to the death of scores of workers and protesters. PZPR leadership is shuffled in response to public pressure.
- **June 1976:** Workers in Radom and Płock, again organize strikes in response to rises in food prices. This time intellectuals and workers begin a concerted effort to work together. The Workers Defense Committee (KOR) and its successor organization Committee for Social Self-Defense “KOR” (KSS-KOR) are formed. In the late 1970s, underground, illegal publications — typically

referred to as samizdat — proliferate. The Coastal Free Trade Union movement is founded to advocate for workers' rights.

- **August 1980:** Worker strikes in Gdańsk and other Baltic Coast-cities lead to the Gdańsk Accords, which allowed for the creation of the Independent Self-Governing Trade Union “Solidarność” (NSZZ Solidarity). Factories, universities, medical facilities, and artistic groups, among others, start founding affiliated committees. Somewhere around 10 million (out of a total number of 38 million Poles) join the new union, including some PZPR members and government employees.
- **December 1981:** Under intense Soviet pressure, the PRL government imposes martial law, declares Solidarity illegal, and interns thousands of Solidarity activist and political opposition members. In the wake of martial law, the government creates a number of new groups meant to find a path forward, like the PRON, as well as its own trade unions to compete with Solidarity (OPZZ). Solidarity rebuilds itself as an underground movement with regional leadership structures and advisory committees. Illegal opposition groups proliferate across the country.
- **September 1986:** After years of releasing and re-arresting opposition activists, the PZPR declares a final amnesty for political prisoners. Solidarity groups and other opposition organizations are able to operate more openly — if still technically illegally. For example, Wałęsa creates the NSZZ Solidarność Temporary Council, as the government and the opposition move toward shared conversations on Poland's political development, culminating in the Round Table talks in February 1989.

4.2. Data preparation

From these pivot points, we constructed a large collection of binary features indicating whether a given individual was a member of an IA during a particular “Era” between checkpoints. For example, early opposition leader Jacek Kuroń was initially a member of the Communist party (PZPR) but left before the student strikes of March 1968. Therefore, a snippet of our preprocessed dataset appears as:

73

Member.ID	Era1-PZPR Member	Era2-PZPR Member	Era3-PZPR Member	Era4-PZPR Member	Era5-PZPR Member	Era6-PZPR Member	Era7-PZPR Member	Era8-PZPR Member
MEM0114	1	1	0	0	0	0	0	0

Table 4.

Era1 indicates the years prior to the first major event checkpoint (date), Era2 indicates the date-date time period, and so on.

74

For modeling purposes, we restrict our dataset to only those affiliated with the *Government* or *Opposition* side at the Round Table meetings, omitting *Experts*, *Observers*, and *Church Members*. In principle, a parallel analysis could be done to incorporate these third-party attendees as additional target categories; in practice, they only represent a small number of individuals (51 total) and cannot be reasonably assumed to have consistent political allegiances. We believe the model interpretation to be stronger without them. We also chose to include both Umbrella IA data and Subgroups IA data (as discussed in Section 2.3.2) in our analysis after determining that results were replicated in terms of both model fitting and coefficient insights when only Umbrella IA membership was used. Since the procedure using the granular subgroup IA data allowed for slightly more nuanced historical context, we present only those results here.

75

4.3. Model fitting, selection, and tuning

With the data prepared, we took a machine learning approach to predict (given an individual's IA affiliations in pre-defined Eras) their formal affiliation at the Round Table meetings. The purpose of this analysis, however, is interpretive, not predictive. We seek to gain insight into which Institutional Affiliations — and at what times — are most associated with individuals representing the Opposition or Communist Government at the Round Table.

76

We opted to fit eight separate models, capturing the predictive power of recorded IA information as of each of the historical checkpoints. That is,

77

- Model 1: Contains Era1 data, i.e., IA membership up to (not including) June 1, 1956.
- Model 2: Contains Era1 and Era2 data, i.e., IA membership up to (not including) March 1, 1968.
- ... and so on.

For each of the eight modeling scenarios, we considered two machine learning algorithms: a *decision tree* and a *penalized logistic regression*. We made use of the *tidymodels* [Kuhn and Wickham 2020] package for tuning and model assessment. The decision tree models were each tuned for cost complexity and tree depth; while the logistic regression models were tuned on the penalty hyperparameter across a large grid of values.

78

To select a best tuned model of each type, we prioritized *Cohen's Kappa* [Cohen 1960], which can be interpreted as the “lift” in predictive ability provided by the model compared to a fully random guess.

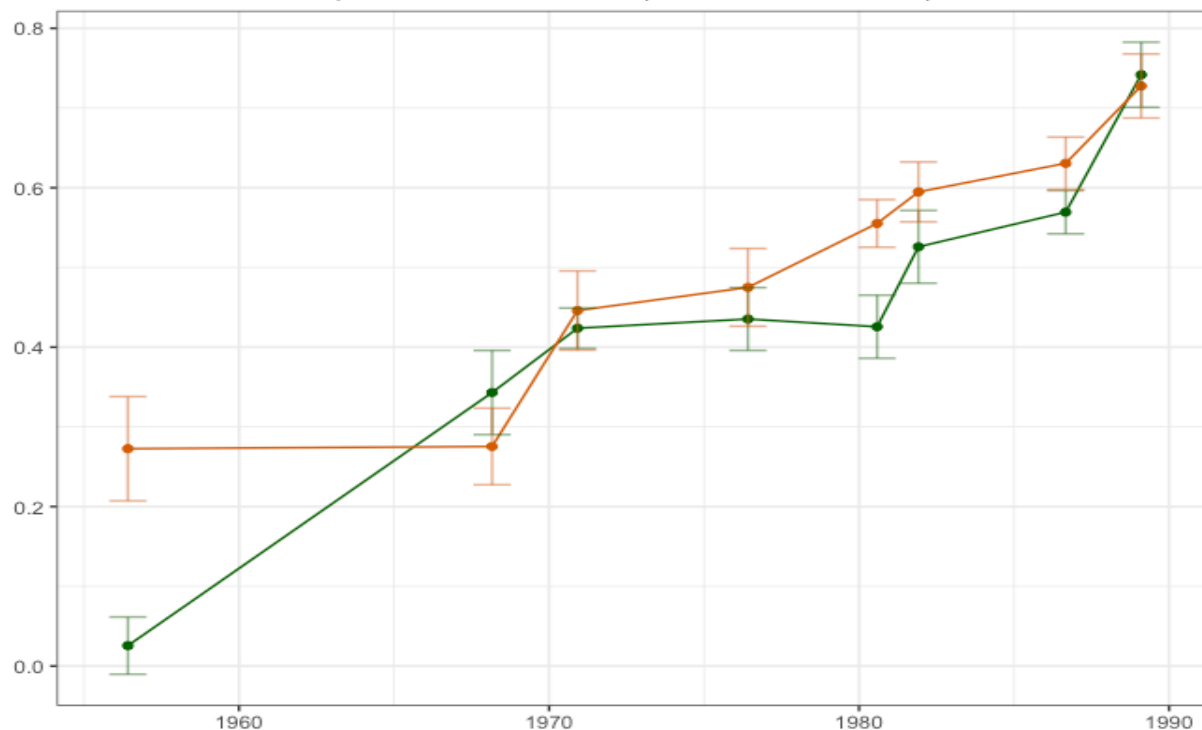
79

With our selected hyperparameter values for each model type, we then compare the decision tree algorithm to the logistic regression algorithm.

80

Cohen's Kappa values for Decision Tree and Logistic Regression models

Round Table affiliation predictions based on IAs prior to historical checkpoints



Scores based on 10-fold cross-validation; 1 standard error bars displayed.

Figure 13. Penalized Logistic Regression shows superior cross-validated Cohen's Kappa scores for most model eras.

It became evident that the penalized logistic regression outperformed the decision tree counterpart consistently across nearly all eras (See Figure 13). Since logistic regression is both the more frequently higher-performance option and the easier of the two to compare interpretive results across eras, we focus only on this model option for the paper. (For tuning, please see Appendix 2.)

81

4.4. Model results

It is clear in Figure 13 that, as expected, predictive power increases over time, as more information about individuals and their IA membership is available to the model. More importantly, though, this improvement is not gradual. Rather, large leaps in predictive power, as measured by Cohen's Kappa, occur from Era 2 to Era 3, and again from Era 6 to Era 7. This points toward the outsized importance of the March 1968 student protests and the formation of Solidarity as decisive moments, when individuals chose to either stay with the Government or break with it and move toward the Opposition. (It is worth noting from Appendix 3 that these patterns are consistent in other common classification metrics.)

82

4.4.1. Logistic regression coefficients by Era

In the following subsections, we highlight a few interesting insights — some confirmatory and some novel — from the models in each era.

83

For purposes of high-level discussion, we show only the top few selected coefficients for each era. Full tables of all non-zero coefficients selected by the L1 regularized model can be found in Appendix 4.

84

	Organization or Event	Change in Prob of Opposition
Era 1	PAN Institute of History	49.0%
<i>Era 1</i>	<i>Central School of Planning and Statistics</i>	<i>-48.6%</i>
<i>Era 1</i>	<i>Warsaw Academy of Political Science</i>	<i>-48.5%</i>
Era 1	Gdańsk Polytechnic	47.8%
Era 1	“Tygodnik Powszechny”	47.7%
Era 1	Medical Academy Kraków	47.6%
<i>Era 1</i>	<i>Warsaw University Faculty of Journalism and Political Studies</i>	<i>-46.9%</i>
Era 1	“Dziś i Jutro”	46.1%
Era 1	Member of Parliament	46.0%
Era 1	Poznań University	45.8%

Table 5. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to June 1956 events.

The position of two Catholic-connected periodicals (“Tygodnik Powszechny” and “Nowa Wieś”) is confirmation of the Church’s role as a relatively independent space. The identification of the PAN Institute of History is interesting as it shows the early likelihood of Bronisław Geremek and Henryk Rutkowski (the only members of the PAN Institute of History in this era) to join the opposition. Given the small number of individuals in the network at this point, insights are limited.

85

	Organization or Event	Change in Prob of Opposition
Era 2	PAN Institute of History	38.9%
<i>Era 2</i>	<i>Democratic Party Member</i>	<i>-37.8%</i>
<i>Era 2</i>	<i>United People's Party</i>	<i>-37.6%</i>
Era 2	Adam Mickiewicz University	36.1%
Era 2	Member of Parliament	34.2%
Era 1	"Tygodnik Powszechny"	32.0%
<i>Era 2</i>	<i>PZPR Member</i>	<i>-31.6%</i>
Era 2	Catholic University of Lublin	29.9%
Era 2	Medical Academy Kraków	28.3%
Era 2	Political Discussion Club - UW	26.3%

Table 6. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to March 1968 student protests.

The importance of connections with PZPR-affiliated political parties (SD and ZSL) is notable, but it is intriguing that PZPR membership is less predictive. Combined with the insight that being a member of Parliament in eras 1 and 2 is actually indicative of later opposition affiliation, this supports the view that older members of the opposition at the Round Table were comfortable maintaining connections to both the Party and the government prior to 1968.

86

	Organization or Event	Change in Prob of Opposition
<i>Era 3</i>	<i>United People's Party</i>	-33.7%
<i>Era 3</i>	<i>Democratic Party Member</i>	-33.0%
<i>Era 3</i>	<i>PZPR Member</i>	-32.8%
Era 3	March 1968 Student Protests Warsaw	30.6%
Era 2	Member of Parliament	29.0%
Era 1	PAN Institute of History	26.5%
Era 3	Wrocław Polytechnic Faculty of Mining	24.9%
Era 2	Adam Mickiewicz University	24.3%
Era 1	"Tygodnik Powszechny"	23.1%
<i>Era 3</i>	<i>Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	-18.2%

Table 7. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to December 1970 workers' strikes in the Baltic Coast.

Era 3 is fascinating as an early sorting moment: when connections to Communist powers (PZPR, SD, and ZSL membership) all mark sustained commitment to the Government side, and participation in the student protests of 1968 clearly led to a high likelihood of future connection to the Opposition. This sorting is less evident, however, in the Shiny App visualizations.

87

	Organization or Event	Change in Prob of Opposition
<i>Era 4</i>	<i>PZPR Member</i>	-32.1%
<i>Era 4</i>	<i>United People's Party</i>	-26.9%
Era 3	March 1968 Student Protests Warsaw	26.0%
<i>Era 4</i>	<i>Democratic Party Member</i>	-22.6%
Era 2	Member of Parliament	12.0%
Era 4	Łódź University Faculty of Socio-Economics	11.9%
Era 4	Wrocław Polytechnic Faculty of Mining	10.3%
Era 1	"Tygodnik Powszechny"	10.0%
<i>Era 4</i>	<i>Association of Polish Socialist Youth</i>	-7.4%
Era 4	"Red Number One" Warsaw Scout Troop	6.9%

Table 8. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to June 1976 workers' strikes in Radom and Plock.

Era 4 is notable because not much changes in the most predictive markers compared to Era 3, evidence that the student upheaval of 1968 was much more influential on RT participants' future paths than the workers' uprising in December 1970.

88

	Organization or Event	Change in Prob of Opposition
<i>Era 5</i>	<i>United People's Party</i>	-40.3%
<i>Era 5</i>	<i>Democratic Party Member</i>	-38.3%
Era 2	Member of Parliament	35.9%
Era 3	March 1968 Student Protests Warsaw	26.3%
Era 5	Government Commission on Economic Reform in Poland	25.9%
Era 5	Warsaw Development Planning Office	25.5%
Era 5	Coastal Free Trade Unions	23.4%
<i>Era 4</i>	<i>PZPR Member</i>	-23.3%
Era 5	KSS-KOR Collaborator	22.5%
<i>Era 4</i>	<i>Association of Polish Socialist Youth</i>	-21.7%

Table 9. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to August 1980 founding of Solidarity.

Era 5 provides quantitative confirmation of the expected importance of KSS-KOR and the Coastal Free Trade Unions movement, as groups openly critical of the government formed after the events of 1976. The emergence of the Government Commission on Economic Reform in Poland is intriguing because it shows the increasing emphasis on economic problems in Opposition critics of the system. The commission is also worthy of further study both because it is an interesting, shared space — of its five members, Cesary Józefiak, Michał Kulesza, and Jan Mujżel end up with the Opposition, and Władysław Baka and Józef Kaleta end up with the Government.

	Organization or Event	Change in Prob of Opposition
Era 6	NSZZ Solidarność Member	43.3%
Era 6	NSZZ Solidarność National Commission Center for Socio-Union Studies	38.9%
<i>Era 6</i>	<i>United People's Party</i>	-36.9%
<i>Era 6</i>	<i>PZPR Member</i>	-34.0%
<i>Era 4</i>	<i>Metalworkers Trade Union</i>	-32.7%
Era 6	NSZZ Individual Farmers "Solidarity" National Founding Committee	30.1%
<i>Era 5</i>	<i>Democratic Party Member</i>	-29.4%
Era 6	Warsaw University Faculty of Law and Administration	26.9%
Era 3	March 1968 Student Protests Warsaw	23.9%
<i>Era 6</i>	<i>Association PAX Main Board</i>	-23.2%

Table 10. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to December 1981 declaration of martial law and banning of Solidarity.

Era 6 notes the emergence of the Solidarity trade union and a corresponding Solidarity group for farmers for reshaping the overall network. Solidarity's National Commission Center for Socio-Union Issues also emerges as a clear precursor to the intellectual networks that shape the opposition's RT roster. Warsaw University's Faculty of Law and Administration's identification with the opposition after August 1980 is notable for further exploration.

	Organization or Event	Change in Prob of Opposition
Era 7	NSZZ Solidarność Member	43.6%
<i>Era 7</i>	<i>Democratic Party Member</i>	-39.8%
<i>Era 7</i>	<i>United People's Party</i>	-39.2%
<i>Era 7</i>	<i>All-Poland Alliance of Trade Unions Member</i>	-37.5%
Era 7	NSZZ Solidarność National Commission Center for Socio-Union Studies	37.3%
<i>Era 7</i>	<i>PZPR Member</i>	-37.3%
Era 7	"Krytyka"	33.0%
Era 6	NSZZ Individual Farmers "Solidarity" National Founding Committee	31.7%
Era 7	Interned	29.3%
<i>Era 5</i>	<i>Metalworkers Trade Union</i>	-29.2%

Table 11. Top 10 magnitude coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to September 1986 granting of amnesty to Opposition activists.

Era 7 solidifies the network split that became apparent in August 1980, in part by adding the shared experience of internment for many Opposition members after the declaration of martial law, tightening the Opposition clique.

91

	Organization or Event	Change in Prob of Opposition
<i>Era 8</i>	<i>PZPR Member</i>	-42.9%
Era 8	Citizens Committee	42.6%
Era 7	NSZZ Solidarność Member	40.2%
<i>Era 7</i>	<i>United People's Party</i>	-34.5%
<i>Era 8</i>	<i>All-Poland Alliance of Trade Unions Member</i>	-33.6%
<i>Era 7</i>	<i>Democratic Party Member</i>	-29.6%
Era 8	NZS	24.8%
Era 6	Polish Ecological Club	21.5%
Era 7	Independent Scouting	21.1%
Era 6	NSZZ Solidarność National Commission Center for Socio-Union Studies	20.2%

Table 12.

As expected, Lech Wałęsa's Citizens Committee appears as a precursor to the Opposition side on the RT, as does the emergence of the All-Poland Alliance of Trade Union Members (OPZZ). The inclusion of the Polish Ecological Club and the NSZ (a Solidarity student group) as Opposition markers is evidence of Solidarity's attempts to include a wider variety of perspectives at the RT.

92

5. Conclusions

Both the Shiny App visualizations and the predictive modeling provide evidence of the radical impact the Solidarity trade union's formation in August 1980 had on the Polish elite, splitting it into a clear opposition side and a clear government side for the first time. From August 1980 (Era 6) onward, membership in NSZZ Solidarność and NSZZ Individual Farmers Solidarity, on one side, and the PZPR, SD, and ZSL on the other are the best predictors of which side of the Round Table people will end up. In the Shiny visualizations, after August 1980 the network forms a clear barbell pattern, with two distinct cliques: one for PZPR members and one for NSZZ Solidarność members. All of this is confirmation of existing literature on the centrality of Solidarity to Poland's political development and an expression of what we would expect to see.

93

There are other pieces of information from the predictive model that provide statistical confirmation of arguments in existing scholarship. The Catholic weekly publication, "Tygodnik Powszechny" is consistently listed as an early indicator of opposition affiliation. Participation in the March 1968 student protests in Warsaw is also a clear marker for the opposition elite at the RT. Membership in the SD and ZSL are consistently strong predictors for government affiliation, confirming the commonly held view that up to February 1989, these junior partners were puppets of the PZPR. Interestingly, PZPR membership only becomes one of the top predictors of government affiliation after the events of 1968. As expected after the events of 1976, KSS-KOR and the Coastal Free Trade Unions emerge as leading indicators of a final opposition affiliation.

94

But together, these two network tools also provide interesting leads for future research by highlighting IAs or shifts over time that may have been missed by qualitative historical analysis. Connections to Adam Mickiewicz University after 1956 (Eras 2 and 3) is a marker for opposition-affiliation. Is there a meaningful connection to the June 1956 riots in Poznan (where Adam Mickiewicz University is located) pointing toward greater continuity between 1956 and 1989? The events of Era 3 — from the March 1968 student protests to just before the December 1970 workers' strikes — have a much stronger effect on predictability than what happens in Era 4 — between December 1970 and the Radom strikes in 1976. Combined with Shiny visualizations that show the importance of academic and intellectual cliques (say KiK or Warsaw University), is this sufficient to confirm the common critique that the RT was not reflective of Solidarity as a workers' movement, or is something else driving this? The two ends of the post-Gdańsk Agreement barbell move further apart with the declaration of martial law and then draw closer together in the build-up to the RT. What's causing this tightening of the network and is this relevant to the success of the Round Table? The NSZZ National Commission Center for Socio-Union Studies shows up as highly predictive from its creation in Era 6 onward. How did this group's work in the 1980s shape the opposition's decision to pursue a negotiated settlement with the PZPR in 1989?

95

The Shiny app visualizations provide avenues for future research as well. From 1956 until the 1970s, the two clearest cliques in the network are those people connected to the PZPR and to Warsaw University, but Warsaw University is not predictive of being on one side or the other at the RT. Did Warsaw University serve as a space for discussion and maintaining the kind of shared experiences that allowed for a negotiated settlement in 1989 — a revolution through reform rather than a violent upheaval? Moreover, the period after 1968 appears in the Shiny visualizations as a time of reshuffling, when old cliques are breaking down and the new PZPR vs. Solidarity cliques have yet to form. What shifting alliances are driving this reshuffling? And finally, even after the Solidarity and PZPR cliques are formed, there are still individuals who connect the two ends of the barbell. What role do these examples of cross-network connectivity play in promoting a peaceful, negotiated end to the Communist system in Poland?

96

The success of our analyses in arriving at both confirmatory and novel historical conclusions leads us to a larger meta-conclusion: Ultimately, we believe that data science has the power to contribute not just results from targeted analyses, but also new tools to facilitate exploration for researchers and domain experts. By making a very complex, real-life network explorable, the dataset and these tools provide quantitatively robust observations that can focus scholars on directed research questions. For example, the insights in the data and visualizations are being used to inform a larger study of the impacts of U.S. exchange programs on Poland's political development at the end of the Cold War, by focusing on a subset of Round Table participants who were also exchange participants and analyzing their roles in the overall network structures before and after their visits to the United States [Domber 2024]. Tools like these can also identify specific examples of groups or individuals — like Wojciech Lamentowicz (Figure 6) who scores exceptionally high in normalized betweenness in the 1970s — that deserve further, focused archival investigation. We see this dataset and these tools not as an end in themselves, but rather an intermediary to help historians, political scientists, and sociologists to ask more specific questions and to find avenues deserving of further investigation using qualitative techniques. To this end, the Round Table dataset and Shiny app are provided as public, open-source, and reproducible tools for to use or alter for educational purposes or to further knowledge of this important moment in the history of democracy.

97

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98

Acknowledgements

Data Repository/Code

Data repository on Google Sheets: bit.ly/polandroundtable

100

R Package: <http://github.com/kbodwin/PolandRoundTable>

101

Appendix 1: Mathematical Explanation of Network Structure

We define the social network between Round Table members at a particular day t by:

102

$$G_t = V(G_t), E(G_t), w(G_t)$$

where $V(G_t)$ is the set of Round Table attendees with at least one shared IA at date t ; and $E(G_t)$ is the set of edges between individuals, where two individuals share an (undirected) edge if they are members of the same IA on date t ; and $w(G_t)$ is a set of edge weights based on how many IAs two members share on date t .

Formally, this graph is itself a projection of the bipartite graph:

103

$$G_t = \nu_1, \nu_2, \xi(G_t)$$

where ν_1 is the set of all Round Table individuals, ν_2 is the set of all IAs, and $\xi(G_t)$ is a set of edges between nodes in ν_1 and nodes in ν_2 , with an edge being present if and only if an individual is a member of an IA on date t .

The bipartite graph is projected onto the space of Round Table individuals, ν_1 such that nodes share an edge in G_t if there exists a two-degree path between them in G_t , and the edge is weighted by the number of unique connecting paths. (We note that G_t may be projected on to the space of ν_2 , the IA nodes, in similar fashion; we do not study that network structure in this work, but we mention it here as a possible path for future study.)

104

The primary function of the *PolandRoundTable* app described in Section 3 is to visualize the network G_t dynamically for any user-chosen date t .

105

Appendix 2: Detailed model fitting, selection, and tuning

With the data prepared, we took a machine learning approach to predict (given an individual's IA affiliations in pre-defined Eras) their formal affiliation at the Round Table meetings. The purpose of this analysis, however, is interpretive, not predictive. We seek to gain insight into which Institutional Affiliations — and at what times — are most associated with individuals representing the Opposition or Communist Government at the Round Table.

106

We opted to fit eight separate models, capturing the predictive power of recorded IA information as of each of the historical checkpoints. That is,

107

- **Model 1:** Contains Era1 data, i.e., IA membership up to (not including) June 1, 1956.
- **Model 2:** Contains Era1 and Era2 data, i.e., IA membership up to (not including) March 1, 1968.
- ... and so on.

For each of the eight modeling scenarios, we considered two machine learning algorithms: a *decision tree* and a *penalized logistic regression*. We did not consider any non-interpretable models, even though they may have had stronger predictive power, because our purpose in this analysis was solely interpretation. For the logistic regression models, we considered only a LASSO (L1) penalty rather than a full elastic net, to encourage strict variable selection while preserving interpretability of the coefficient estimates.

108

We made use of the *tidymodels* [Kuhn and Wickham 2020] package for tuning and model assessment. The decision tree models were each tuned for cost complexity and tree depth; while the logistic regression models were tuned on the penalty hyperparameter across a large grid of values.

109

Hyperparameter tuning

To select a best tuned model of each type, we prioritized *Cohen's Kappa* [Cohen 1960], which can be interpreted as the “lift” in predictive ability provided by the model compared to a fully random guess. We opted for the “one standard error rule” approach to hyperparameter selection [Breiman et al. 1984], which selects the most parsimonious model — in this case, the largest L1 penalty — that results in a cross-validated Kappa value within one standard error of the best-scoring model. This choice makes sense for our particular problem space, since our goal in penalization is stricter variable selection. In other words, we sacrifice a statistically negligible drop in estimated predictive ability to achieve a simpler and more interpretable final model.

110

Figure 14 shows the cross-validated values of Cohen's Kappa across the hyperparameter grid for the logistic regression model for the eight

Eras. The patterns in this figure support our use of Breiman's one-SE approach: In each era, there is a range of L1 penalty values that achieve near-equal Kappa metrics, before a steeper drop-off at higher penalty values.

111

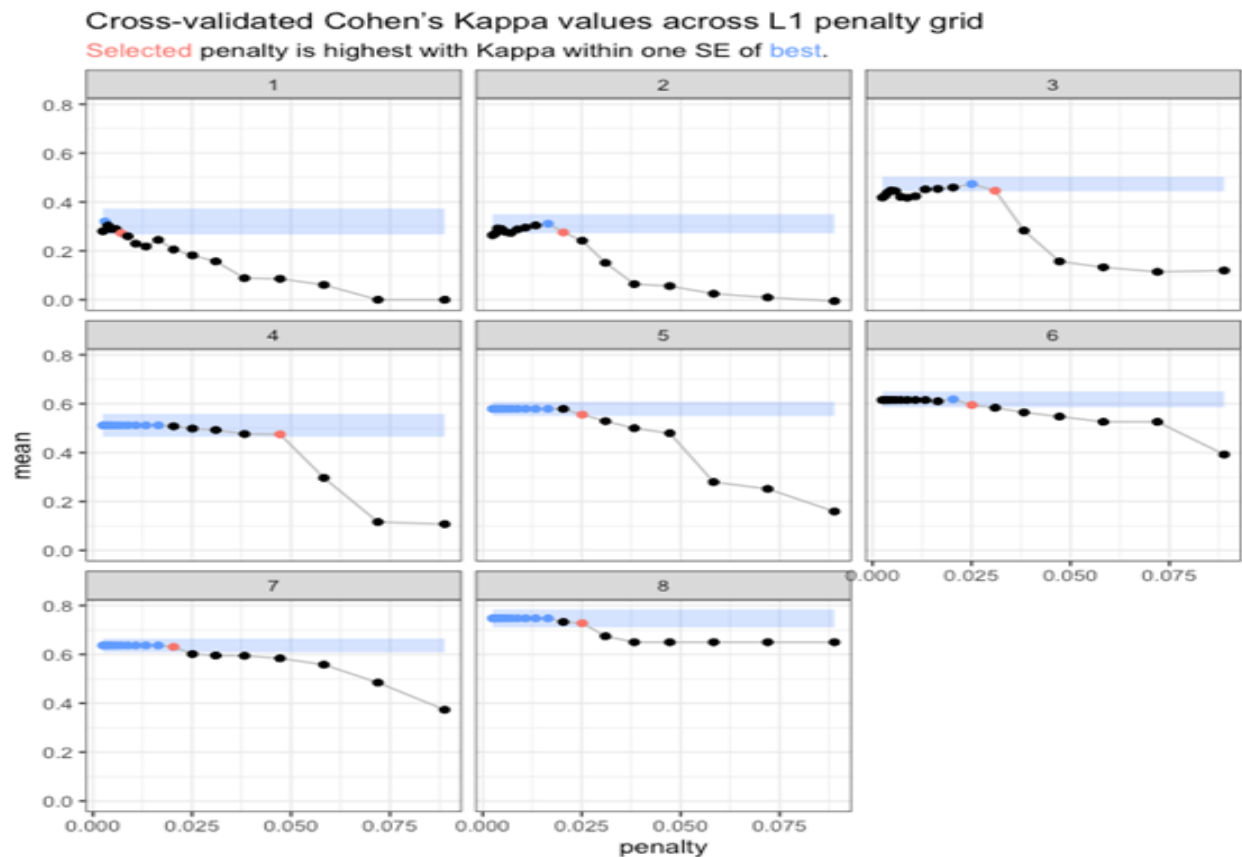


Figure 14. Penalties selected by Breiman's 1-SE method achieve near-identical metric scores to best model.

Appendix 3 shows the numeric values for this figure, as well as values of other common classification metrics: ROC-AUC, F1 Score, and accuracy. The patterns in these metrics over the hyperparameter grid are similar to those seen in Figure 13.

112

Model selection

With our selected hyperparameter values for each model type, we then compare the decision tree algorithm to the logistic regression algorithm. Figure 13 shows the cross-validated Cohen's Kappa values for the selected model of each type at each era.

113

It became evident that the penalized logistic regression outperformed the decision tree counterpart consistently across nearly all eras, although the difference is not compelling for earlier era models. (See Figure 13) Since logistic regression is both the more frequently higher-performance option and the easier of the two to compare interpretive results across eras, we focus only on this model option for the paper.

114

Note

Recall that the cutoffs for the eight Eras were ad hoc choices based on domain expertise, identified prior to any data analysis. In the interest of being thorough, we also applied this analysis to a structure where each individual calendar year from 1950 to 1989 was treated as a standalone era. The resulting pattern in measured predictive abilities over time was similar to that seen in Figure 13; although models were in general more volatile due to the large number of coefficients (i.e., one dummy variable for each IA in each of the 40 years).

115

We view the original eight eras not as indisputable truths, but as reasonable narrative choices for checkpoints along the longitudinal data analysis.

116

Appendix 3: Tuning results

	Accuracy		F1 Score		Cohen's Kappa		ROC-AUC		Sensitivity		Specificity	
penalty	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE	mean	SE
Era 1 (up to June 01, 1956)												
0.003	0.717	0.023	0.799	0.018	0.320	0.053	0.706	0.040	0.851	0.029	0.450	0.051

0.007	0.707	0.026	0.797	0.019	0.273	0.065	0.728	0.040	0.866	0.026	0.386	0.057
Era 2 (up to March 01, 1968)												
0.016	0.664	0.022	0.705	0.029	0.311	0.039	0.740	0.029	0.676	0.058	0.646	0.066
0.020	0.655	0.022	0.706	0.027	0.275	0.048	0.749	0.029	0.694	0.057	0.592	0.085
Era 3 (up to December 02, 1970)												
0.025	0.735	0.017	0.758	0.020	0.474	0.030	0.796	0.013	0.692	0.032	0.804	0.015
0.031	0.728	0.018	0.756	0.016	0.446	0.050	0.787	0.010	0.700	0.041	0.773	0.081
Era 4 (up to June 01, 1976)												
0.002	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.003	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.004	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.005	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.006	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.007	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.009	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.011	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.013	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.016	0.755	0.024	0.772	0.025	0.512	0.047	0.831	0.024	0.712	0.033	0.817	0.028
0.047	0.728	0.027	0.722	0.033	0.475	0.049	0.777	0.027	0.616	0.041	0.890	0.026
Era 5 (up to August 01, 1980)												
0.002	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.003	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.004	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.005	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.006	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.007	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.009	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.011	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.013	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.016	0.790	0.016	0.809	0.018	0.579	0.029	0.860	0.011	0.766	0.034	0.825	0.025
0.025	0.776	0.016	0.789	0.018	0.555	0.030	0.855	0.009	0.722	0.028	0.854	0.024
Era 6 (up to December 01, 1981)												
0.020	0.822	0.014	0.862	0.010	0.618	0.033	0.913	0.010	0.956	0.014	0.639	0.040
0.025	0.813	0.016	0.858	0.011	0.595	0.038	0.915	0.009	0.968	0.008	0.600	0.041
Era 7 (up to September 01, 1986)												
0.002	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.003	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.004	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.005	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.006	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.007	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.009	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.011	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034

0.013	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.016	0.834	0.012	0.875	0.008	0.637	0.028	0.939	0.013	0.975	0.008	0.630	0.034
0.020	0.832	0.014	0.874	0.009	0.631	0.033	0.937	0.013	0.979	0.006	0.619	0.036
Era 8 (up to February 06, 1989)												
0.002	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.003	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.004	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.005	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.006	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.007	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.009	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.011	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.013	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.016	0.884	0.016	0.911	0.011	0.747	0.037	0.971	0.007	0.993	0.005	0.726	0.041
0.025	0.875	0.017	0.906	0.012	0.728	0.040	0.962	0.010	0.993	0.005	0.706	0.045

Table 13. Tuning results for Era 1 to Era 8.

Appendix 4: Nonzero coefficients of final penalized logic regression model to predict RT Affiliation from IA membership across multiple eras

Organization or Profession	Change in Prob of Opposition
Era1-PAN Institute of History	49.0%
<i>Era1-Central School of Planning and Statistics</i>	-48.6%
<i>Era1-Warsaw Academy of Political Science</i>	-48.5%
Era1-Gdańsk Polytechnic	47.8%
Era1-"Tygodnik Powszechny"	47.7%
Era1-Medical Academy Kraków	47.6%
<i>Era1-Warsaw University Faculty of Journalism and Political Studies</i>	-46.9%
Era1-"Dziś i Jutro"	46.1%
Era1-Member of Parliament	46.0%
Era1-Poznań University	45.8%
Era1-Warsaw University Faculty of Polish Philology	45.1%
<i>Era1-Association of Polish Journalists</i>	-43.7%
<i>Era1-Ministry of Religious Denominations and and Public Education Department of Denominations</i>	-42.6%
<i>Era1-Jagiellonian University Medical College Faculty of Medicine</i>	-42.3%
<i>Era1-Warsaw University Faculty of Pedagogy</i>	-41.6%
Era1-"Nowa Wieś"	40.8%
Era1-Copernicus University Humanities Faculty	40.5%
<i>Era1-Association of Polish Lawyers</i>	-40.4%
<i>Era1-Wrocław University Faculty of Law</i>	-39.6%
Era1-Jagiellonian University Faculty of Law	37.9%
<i>Era1-AGH Kraków Faculty of Mechanical Engineering</i>	-37.7%

Era1-Club of the Crooked Circle	37.4%
Era1-Medical Academy Warsaw	37.1%
Era1-Ministry of Justice	35.5%
Era1-Polish Socialist Party	35.3%
<i>Era1-People's Party Member</i>	-35.0%
<i>Era1-Adam Mickiewicz University Faculty of Law and Administration</i>	-33.9%
<i>Era1-Warsaw Polytechnic Faculty of Chemistry</i>	-33.2%
<i>Era1-Association PAX</i>	-32.9%
Era1-Independent Union of Socialist Youth	32.6%
<i>Era1-Union of Polish Students</i>	-31.8%
<i>Era1-AGH Krakow Faculty of Geologic Exploration</i>	-31.5%
<i>Era1-Gdańsk Polytechnic Faculty of Architecture</i>	-31.1%
<i>Era1-Warsaw University Faculty of Political Economy</i>	-30.8%
<i>Era1-Association of Polish Youth</i>	-30.6%
<i>Era1-Society of the Workers University's Youth Organization</i>	-29.3%
Era1-Warsaw Uprising	28.7%
<i>Era1-Union of Polish Teachers</i>	-26.4%
Era1-Warsaw University Faculty of Philosophy and Sociology	26.4%
Era1-"Wrocławski Tygodnik Katolicki"	26.3%
<i>Era1-Poznań University Faculty of Law</i>	-25.8%
<i>Era1-Polish People's Army Enlisted</i>	-25.1%
Era1-Catholic University of Lublin	24.9%
<i>Era1-AGH Kraków Faculty of Mining Mechanization and Metallurgy</i>	-23.8%
<i>Era1-Association of Rural Youth "Wici"</i>	-23.5%
Era1-Catholic University of Lublin Faculty of Philosophy	23.3%
<i>Era1-United People's Party</i>	-22.3%
<i>Era1-PPR Member</i>	-22.2%
Era1-Polish Scouting Association	19.4%
Era1-Warsaw Polytechnic Faculty of Engineering	18.0%
Era1-"Po Prostu"	16.8%
<i>Era1-"Nowa Kultura"</i>	-15.4%
<i>Era1-Higher School of Engineering Poznan</i>	-13.6%
<i>Era1-Warsaw University Faculty of Law and Administration</i>	-11.1%
Era1-Warsaw University Faculty of Economics	8.0%
<i>Era1-Łódź University Faculty of Socio-Economics</i>	-7.4%
<i>Era1-Polish Associations of Historians</i>	-6.6%
Era1-AGH Kraków Faculty of Mining	5.7%

Table 14. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to June 1956.

Organization or Profession	Change in Prob of Opposition
Era2-PAN Institute of History	38.9%
<i>Era2-Democratic Party Member</i>	-37.8%

<i>Era2-United People's Party</i>	-37.6%
Era2-Adam Mickiewicz University	36.1%
Era2-Member of Parliament	34.2%
Era1-"Tygodnik Powszechny"	32.0%
<i>Era2-PZPR Member</i>	-31.6%
Era2-Catholic University of Lublin	29.9%
Era2-Medical Academy Kraków	28.3%
Era2-Political Discussion Club - UW	26.3%
<i>Era1-Wrocław University Faculty of Law</i>	-25.7%
<i>Era2-Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	-25.4%
<i>Era1-Ministry of Religious Denominations and and Public Education Department of Denominations</i>	-23.5%
<i>Era1-Jagiellonian University Medical College Faculty of Medicine</i>	-23.4%
Era2-Gdańsk Shipyards	22.9%
<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	-22.4%
Era2-"Red Number One" Warsaw Scout Troop	22.2%
<i>Era2-Association of Polish Socialist Youth</i>	-21.9%
<i>Era2-Polish Economic Society</i>	-21.3%
<i>Era1-"Nowa Kultura"</i>	-20.9%
<i>Era2-Warsaw Polytechnic Faculty of Engineering</i>	-20.5%
<i>Era2-"Słowo Powszechne"</i>	-20.4%
Era2-Warsaw University Faculty of Philosophy and Sociology	20.3%
Era1-Independent Union of Socialist Youth	20.2%
Era2-Club for Contradiction Seekers	20.2%
Era2-Open Letter to Party Members	20.1%
Era2-"Więź"	20.0%
Era1-Ministry of Justice	19.6%
<i>Era1-Union of Polish Students</i>	-19.6%
Era1-Warsaw University Faculty of Polish Philology	18.1%
<i>Era2-Association PAX</i>	-17.7%
Era1-Jagiellonian University Faculty of Law	17.2%
Era2-"Sztandar Młodych"	16.3%
Era2-District Court Warsaw	15.5%
Era1-Gdańsk Polytechnic	15.3%
Era2-Association of Polish Architects	14.3%
Era1-Medical Academy Warsaw	14.1%
<i>Era1-Gdańsk Polytechnic Faculty of Architecture</i>	-13.9%
Era2-Warsaw University Faculty of Physics	12.9%
<i>Era2-Silesia Polytechnic Faculty of Mining</i>	-12.7%
<i>Era1-Union of Polish Teachers</i>	-12.2%
<i>Era2-Union of Polish Teachers</i>	-12.1%
<i>Era2-Association of Rural Youth</i>	-10.9%
Era2-Warsaw University Faculty of Economics	10.5%

Era2-Lenin Steelworks Nowa Huta	10.2%
<i>Era1-Warsaw University Faculty of Pedagogy</i>	<i>-10.1%</i>
<i>Era2-Polish Scouting Association Main Headquarters</i>	<i>-10.1%</i>
<i>Era1-Polish People's Army Enlisted</i>	<i>-9.8%</i>
<i>Era1-Warsaw Polytechnic Faculty of Chemistry</i>	<i>-8.7%</i>
<i>Era1-AGH Kraków Faculty of Mining Mechanization and Metallurgy</i>	<i>-8.0%</i>
<i>Era2-Ministry of Construction and Building Materials</i>	<i>-7.6%</i>
<i>Era1-Association of Polish Youth</i>	<i>-7.6%</i>
<i>Era2-Central School of Planning and Statistics</i>	<i>-7.4%</i>
<i>Era2-PAN Institute of Law and Society</i>	<i>-7.3%</i>
<i>Era1-Central School of Planning and Statistics</i>	<i>-7.2%</i>
Era2-PAN Institute of Philosophy and Sociology	6.9%
<i>Era1-Warsaw University Faculty of Journalism and Political Studies</i>	<i>-6.8%</i>
Era2-Jagiellonian University Faculty of Polish Philology	6.4%
<i>Era2-Central School of Planning and Statistics Faculty of Production Economics</i>	<i>-6.1%</i>
<i>Era2-Central School of Planning and Statistics Faculty of Foreign Trade</i>	<i>-5.8%</i>
<i>Era2-Association of Polish Lawyers</i>	<i>-5.7%</i>
<i>Era2-Marie Curie-Skłodowska University Faculty of Law</i>	<i>-5.5%</i>

Table 15. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to March 1968.

Organization or Profession	Change in Prob of Opposition
<i>Era3-United People's Party</i>	-33.7%
<i>Era3-Democratic Party Member</i>	-33.0%
<i>Era3-PZPR Member</i>	-32.8%
Era3-March 1968 Student Protests Warsaw	30.6%
Era2-Member of Parliament	29.0%
Era1-PAN Institute of History	26.5%
Era3-Wrocław Polytechnic Faculty of Mining	24.9%
Era2-Adam Mickiewicz University	24.3%
Era1-"Tygodnik Powszechny"	23.1%
<i>Era3-Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	-18.2%
<i>Era3-World Health Organization</i>	-16.0%
Era2-Medical Academy Kraków	14.4%
Era3-Catholic University of Lublin	13.5%
<i>Era3-Association PAX</i>	-11.7%
<i>Era3-Wrocław University Faculty of Law</i>	-10.9%
Era2-"Więź"	10.9%
<i>Era1-Wrocław University Faculty of Law</i>	-10.7%
<i>Era2-Polish Economic Society</i>	-10.0%
<i>Era1-Warsaw Polytechnic Faculty of Chemistry</i>	-9.7%
<i>Era2-"Słowo Powszechne"</i>	-9.3%
<i>Era1-Ministry of Religious Denominations and and Public Education Department of Denominations</i>	-8.6%
<i>Era2-Association of Polish Socialist Youth</i>	-8.5%
<i>Era1-Union of Polish Students</i>	-8.4%
Era1-Medical Academy Warsaw	8.1%
Era3-Association of Polish Architects	8.0%
<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	-7.9%
<i>Era1-"Nowa Kultura"</i>	-7.5%
Era2-"Red Number One" Warsaw Scout Troop	7.4%
Era1-Jagiellonian University Faculty of Law	7.3%
Era3-Gdańsk Shipyards	6.7%
Era2-Political Discussion Club - UW	6.5%
Era2-Warsaw University Faculty of Philosophy and Sociology	6.1%
Era3-Warsaw University Faculty of Physics	5.4%

Table 16. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to December 1970.

Organization or Profession	Change in Prob of Opposition
<i>Era4-PZPR Member</i>	-32.1%
<i>Era4-United People's Party</i>	-26.9%
Era3-March 1968 Student Protests Warsaw	26.0%
<i>Era4-Democratic Party Member</i>	-22.6%
Era2-Member of Parliament	12.0%
Era4-Łódź University Faculty of Socio-Economics	11.9%
Era4-Wrocław Polytechnic Faculty of Mining	10.3%
Era1-"Tygodnik Powszechny"	10.0%
<i>Era4-Association of Polish Socialist Youth</i>	-7.4%
Era4-"Red Number One" Warsaw Scout Troop	6.9%
Era4-Adam Mickiewicz University	6.7%
Era4-Letter Signed by 101	6.2%

Table 17. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to June 1976.

Organization or Profession	Change in Prob of Opposition
<i>Era5-United People's Party</i>	-40.3%
<i>Era5-Democratic Party Member</i>	-38.3%
Era2-Member of Parliament	35.9%
Era3-March 1968 Student Protests Warsaw	26.3%
Era5-Government Commission on Economic Reform in Poland	25.9%
Era5-Warsaw Development Planning Office	25.5%
Era5-Coastal Free Trade Unions	23.4%
<i>Era4-PZPR Member</i>	-23.3%
Era5-KSS-KOR Collaborator	22.5%
<i>Era4-Association of Polish Socialist Youth</i>	-21.7%
<i>Era5-Sejm Delegate Without Party</i>	-21.4%
<i>Era4-Association PAX</i>	-21.3%
Era2-Adam Mickiewicz University	20.8%
Era4-Łódź University Faculty of Socio-Economics	20.6%
Era5-Society for Academic Courses	19.0%
<i>Era5-National Union of Farmers, Agricultural Groups and Organizations</i>	-18.7%
Era5-"Biuletyn Informacyjny" KSS-KOR	18.7%
<i>Era3-Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	-18.5%
<i>Era5-PZPR Member</i>	-18.2%
<i>Era1-Wrocław University Faculty of Law</i>	-17.5%
<i>Era1-Ministry of Religious Denominations and and Public Education Department of Denominations</i>	-16.9%
Era5-Seminar on Experience and the Future in Warsaw	16.7%
Era2-Medical Academy Kraków	16.7%

<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	-16.3%
<i>Era4-Institute of Labor and Social Issues</i>	-15.9%
<i>Era1-Union of Polish Students</i>	-15.5%
Era4-Adam Mickiewicz University	15.5%
Era1-Jagiellonian University Faculty of Law	15.1%
<i>Era5-PAN Legal Sciences Committee</i>	-14.9%
<i>Era5-Warsaw Construction Machine Works</i>	-14.8%
<i>Era4-Institute for Environmental Development</i>	-14.8%
<i>Era4-World Health Organization</i>	-14.5%
<i>Era1-"Nowa Kultura"</i>	-14.0%
Era5-"Krytyka"	13.8%
Era2-Catholic University of Lublin	13.6%
Era4-"Red Number One" Warsaw Scout Troop	13.5%
Era5-KOR Collaborator	13.1%
Era4-District Court Warsaw	10.9%
Era1-Medical Academy Warsaw	10.8%
Era4-Wrocław Polytechnic Faculty of Mining	10.7%
Era5-Central School of Planning and Statistics Department of Economic Politics	9.6%
<i>Era3-Wrocław University Faculty of Law</i>	-9.5%
<i>Era1-Warsaw University Faculty of Journalism and Political Studies</i>	-9.2%
Era3-"Tygodnik Powszechny"	8.8%
Era3-Gdańsk Shipyards	8.6%
<i>Era2-Polish Economic Society</i>	-8.6%
<i>Era2-"Słowo Powszechnie"</i>	-8.4%
<i>Era3-World Health Organization</i>	-8.1%
Era3-March 1968 Student Protests Wrocław	7.6%
Era3-Wrocław Polytechnic Faculty of Mining	7.4%
<i>Era2-Union of Polish Teachers</i>	-7.3%
Era4-Polish Sociological Association	7.3%
Era4-Copper Mining and Smelting Plant Lubin	6.5%
<i>Era5-Association PAX Presidium</i>	-6.4%
Era1-"Tygodnik Powszechny"	6.4%
Era5-Association of Polish Architects	6.3%
<i>Era5-Association of Polish Engineers and Technicians</i>	-6.2%
Era1-Gdańsk Polytechnic	6.2%
<i>Era4-Polish Scouting Association Main Headquarters</i>	-5.7%
<i>Era1-Association of Polish Youth</i>	-5.1%

Table 18. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to August 1980.

Organization or Profession	Change in Prob of Opposition
Era6-NSZZ Solidarność Member	43.3%

Era6-NSZZ Solidarność National Commission Center for Socio-Union Studies	38.9%
<i>Era6-United People's Party</i>	-36.9%
<i>Era6-PZPR Member</i>	-34.0%
<i>Era4-Metalworkers Trade Union</i>	-32.7%
Era6-NSZZ Individual Farmers "Solidarity" National Founding Committee	30.1%
<i>Era5-Democratic Party Member</i>	-29.4%
Era6-Warsaw University Faculty of Law and Administration	26.9%
Era3-March 1968 Student Protests Warsaw	23.9%
<i>Era6-Association PAX Main Board</i>	-23.2%
Era2-Member of Parliament	20.8%
Era5-Coastal Free Trade Unions	19.2%
Era1-"Tygodnik Powszechny"	18.4%
<i>Era6-Association PAX</i>	-18.2%
<i>Era6-Sejm Delegate Without Party</i>	-18.0%
Era6-Polish Ecological Club	18.0%
<i>Era4-World Health Organization</i>	-17.6%
Era6-First Solidarność National Congress Delegate	17.4%
Era6-KSS-KOR Collaborator	16.2%
Era6-Rural Solidarność Rzeszow Agreement Signatory	15.0%
Era5-KOR Collaborator	14.8%
<i>Era6-PAN Committee on Pedagogical Sciences</i>	-14.2%
<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	-13.4%
<i>Era4-Association of Polish Socialist Youth</i>	-13.1%
<i>Era3-Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	-12.6%
<i>Era1-Union of Polish Students</i>	-12.0%
<i>Era4-Institute for Environmental Development</i>	-12.0%
<i>Era4-Institute of Labor and Social Issues</i>	-11.9%
<i>Era1-"Nowa Kultura"</i>	-11.7%
<i>Era5-Warsaw Construction Machine Works</i>	-11.7%
<i>Era6-National Union of Farmers, Agricultural Groups and Organizations</i>	-11.1%
Era4-District Court Warsaw	10.7%
<i>Era1-Wrocław University Faculty of Law</i>	-10.1%
Era1-Gdańsk Polytechnic	9.5%
<i>Era1-Ministry of Religious Denominations and and Public Education Department of Denominations</i>	-8.5%
<i>Era5-PAN Legal Sciences Committee</i>	-8.3%
Era6-NSZZ Individual Farmers "Solidarity" advisor	8.2%
Era6-Andrzej Małkowski Circle of Scouting Instructors	7.9%
<i>Era3-Wrocław University Faculty of Law</i>	-7.8%
Era3-Adam Mickiewicz University	7.6%
<i>Era6-Council of Ministers</i>	-7.3%

Era2-Catholic University of Lublin	7.0%
<i>Era3-Warsaw Polytechnic Faculty of Engineering</i>	<i>-7.0%</i>
Era1-Warsaw University Faculty of Polish Philology	6.8%
<i>Era6-Democratic Party Member</i>	<i>-6.7%</i>
Era6-Factory Committee Solidarność Medical Academy Kraków	6.6%
Era6-Society for the Promotion and Propagation of Science	6.6%
Era6-Seminar on Experience and the Future in Warsaw	6.4%
<i>Era6-Metalworkers Trade Union</i>	<i>-6.1%</i>
<i>Era6-National Unity Front National Committee Presidium</i>	<i>-5.8%</i>
<i>Era6-Report on the observance of human and civil rights in the People's Republic</i>	<i>-5.6%</i>
Era6-NSZZ Solidarność Advisor	5.2%
Era5-Medical Academy Kraków	5.2%

Table 19. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to December 1981.

Organization or Profession	Change in Prob of Opposition
Era7-NSZZ Solidarność Member	43.6%
<i>Era7-Democratic Party Member</i>	<i>-39.8%</i>
<i>Era7-United People's Party</i>	<i>-39.2%</i>
<i>Era7-All-Poland Alliance of Trade Unions Member</i>	<i>-37.5%</i>
Era7-NSZZ Solidarność National Commission Center for Socio-Union Studies	37.3%
<i>Era7-PZPR Member</i>	<i>-37.3%</i>
Era7-"Krytyka"	33.0%
Era6-NSZZ Individual Farmers "Solidarity" National Founding Committee	31.7%
Era7-Interned	29.3%
<i>Era5-Metalworkers Trade Union</i>	<i>-29.2%</i>
<i>Era7-National Union of Farmers, Agricultural Groups and Organizations</i>	<i>-28.2%</i>
<i>Era7-Sejm Delegate Without Party</i>	<i>-26.4%</i>
Era1-"Tygodnik Powszechny"	25.1%
Era6-Polish Ecological Club	23.9%
Era7-Independent Scouting	23.2%
<i>Era2-Primate Stefan Wyszyński Information Office</i>	<i>-23.2%</i>
Era7-Warsaw University Faculty of Law and Administration	22.7%
<i>Era7-State Tribunal</i>	<i>-21.8%</i>
<i>Era1-"Nowa Kultura"</i>	<i>-20.5%</i>
<i>Era7-Ministry of Labor and Social Welfare Department of Labor Law</i>	<i>-19.9%</i>
Era3-March 1968 Student Protests Warsaw	19.4%
Era7-Agricultural Foundation Organizing Committee	18.9%
<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	<i>-18.6%</i>
Era5-KOR Collaborator	18.3%

Era7-Seminar on "Poland in Europe"	17.6%
<i>Era7-Patriotic Movement for National Revival</i>	<i>-17.4%</i>
Era2-Member of Parliament	16.9%
<i>Era1-Union of Polish Students</i>	<i>-16.9%</i>
<i>Era1-Wrocław University Faculty of Law</i>	<i>-16.8%</i>
Era7-Gdańsk University Humanities Division	16.7%
<i>Era4-Institute of Labor and Social Issues</i>	<i>-16.4%</i>
Era7-NZS	16.0%
Era7-NSZZ Solidarność Temporary Coordinating Commission	15.6%
Era7-Medical Academy Gdańsk	15.3%
Era7-Catholic University of Lublin Department of Modern History	14.7%
<i>Era4-Institute for Environmental Development</i>	<i>-14.6%</i>
<i>Era7-Institute of Mechanization of Building and Rock Mining in Warsaw</i>	<i>-14.4%</i>
<i>Era5-Warsaw Construction Machine Works</i>	<i>-13.9%</i>
Era5-Coastal Free Trade Unions	13.8%
Era7-NSZZ Solidarność Gdańsk Regional Coordinating Committee	13.6%
<i>Era4-Central School of Planning and Statistics Faculty of Economics and Social Sciences</i>	<i>-13.4%</i>
Era7-Lenin Shipyards Gdańsk	13.4%
<i>Era1-Warsaw University Faculty of Journalism and Political Studies</i>	<i>-13.4%</i>
Era1-Gdańsk Polytechnic	13.4%
<i>Era7-"Kierunki"</i>	<i>-12.7%</i>
Era6-Center for Civic Legislative Initiatives on Solidarity	12.3%
<i>Era3-Warsaw Polytechnic Faculty of Engineering</i>	<i>-11.8%</i>
Era6-Rural Solidarność Rzeszow Agreement Signatory	11.6%
Era6-Factory Committee Solidarność Medical Academy Kraków	11.3%
<i>Era7-PAN Legal Sciences Committee</i>	<i>-10.9%</i>
Era4-District Court Warsaw	10.8%
<i>Era7-Council of Ministers Commission on Economic Reform</i>	<i>-10.8%</i>
Era6-First Solidarność National Congress Delegate	10.4%
Era6-Society for the Promotion and Propagation of Science	9.9%
<i>Era7-PAN Committee on Pedagogical Sciences</i>	<i>-9.5%</i>
Era6-KSS-KOR Collaborator	9.1%
<i>Era7-Association PAX Main Board</i>	<i>-9.0%</i>
Era7-Primates Committee for People Deprived of their Liberty and their Families	8.8%
<i>Era7-Council of Ministers Legislative Council for the President RM</i>	<i>-8.8%</i>
<i>Era2-"Słowo Powszechne"</i>	<i>-8.3%</i>
<i>Era3-World Health Organization</i>	<i>-7.9%</i>
Era2-Catholic University of Lublin	7.3%
Era7-PAN Institute of Economics	7.0%
<i>Era3-Wrocław University Faculty of Law</i>	<i>-6.8%</i>

Era6-NSZZ Solidarność Advisor	6.7%
<i>Era1-Union of Polish Teachers</i>	<i>-6.5%</i>
Era5-Medical Academy Kraków	5.7%
Era3-"Red Number One" Warsaw Scout Troop	5.5%
Era7-Report Poland Five Years After August	5.2%

Table 20. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to September 1986.

Organization or Profession	Change in Prob of Opposition
<i>Era8-PZPR Member</i>	<i>-42.9%</i>
Era8-Citizens Committee	42.6%
Era7-NSZZ Solidarność Member	40.2%
<i>Era7-United People's Party</i>	<i>-34.5%</i>
<i>Era8-All-Poland Alliance of Trade Unions Member</i>	<i>-33.6%</i>
<i>Era7-Democratic Party Member</i>	<i>-29.6%</i>
Era8-NZS	24.8%
Era6-Polish Ecological Club	21.5%
Era7-Independent Scouting	21.1%
Era6-NSZZ Solidarność National Commission Center for Socio-Union Studies	20.2%
Era6-KSS-KOR Collaborator	19.9%
Era7-Interned	19.2%
<i>Era8-Sejm Delegate Without Party</i>	<i>-18.5%</i>
<i>Era7-National Union of Farmers, Agricultural Groups and Organizations</i>	<i>-18.4%</i>
<i>Era8-Council of Ministers</i>	<i>-15.9%</i>
Era7-Commission for the Realization of the Rzeszow-Ustrycki Agreement	13.6%
Era8-Warsaw University Faculty of Law and Administration	13.2%
Era8-Gdańsk University Humanities Division	13.0%
Era7-Member of Parliament	11.9%
Era7-Medical Academy Gdańsk	11.7%
Era4-District Court Warsaw	11.4%
<i>Era8-Patriotic Movement for National Revival</i>	<i>-11.4%</i>
Era5-Medical Academy Kraków	11.2%
<i>Era2-Medical Academy Lublin Faculty of Medicine</i>	<i>-10.3%</i>
<i>Era4-Institute of Labor and Social Issues</i>	<i>-10.3%</i>
<i>Era7-State Tribunal</i>	<i>-10.1%</i>
Era8-NSZZ Solidarność Advisor	9.8%
<i>Era4-Institute for Environmental Development</i>	<i>-9.4%</i>
<i>Era8-PAN Legal Sciences Committee</i>	<i>-9.3%</i>
<i>Era1-"Nowa Kultura"</i>	<i>-8.9%</i>
<i>Era7-Ministry of Labor and Social Welfare Department of Labor Law</i>	<i>-8.9%</i>

<i>Era7-Association PAX Main Board</i>	-8.9%
<i>Era3-Warsaw Polytechnic Faculty of Engineering</i>	-8.4%
Era8-Agricultural Foundation Organizing Committee	8.2%
<i>Era1-Union of Polish Students</i>	-7.5%
Era1-Gdańsk Polytechnic	6.7%
<i>Era7-"Kierunki"</i>	-6.6%
<i>Era8-Council of Ministers Council for the Protection of the Memory of Struggle and Martyrdom</i>	-6.3%
<i>Era1-Wrocław University Faculty of Law</i>	-6.3%
Era4-"Red Number One" Warsaw Scout Troop	6.0%
<i>Era5-Warsaw Construction Machine Works</i>	-5.6%
<i>Era4-World Health Organization</i>	-5.1%
Era8-NZS National Coordinating Commission	5.1%

Table 21. All nonzero coefficients of final penalized logistic regression model to predict RT Affiliation from IA membership prior to February 1989

Notes

126

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[2] The choice of IAs was dictated by practical considerations (what records could be consistently located for RT participants), and theoretical ones. The work presented in this paper is a foundational piece of a larger project seeking to test a hypothesis that American-sponsored exchange programs which brought Poles to the United States between 1956 and 1989 fostered moderation and an awareness of Western political and economic structures that facilitated Poland's negotiated revolution. To pursue this larger goal, we first needed to be able to study domestic networks. This broader project is inspired by scholarship theorizing the role of exchange programs to shift elites' thinking and identity regarding policy issues [Scott-Smith 2008]. It is also in direct conversation with scholarship showcasing the way foreign groups influenced Soviet thinking as Communism collapsed across Eastern Europe [Snyder 2011] [Evangelista 1999]. Robert English convincingly traces Western intellectuals' effects on Soviet leader Mikhail Gorbachev's new strategic thinking in the 1980s, and he develops the idea that foreign ties can "facilitate a shift in intellectuals' essential 'self-categorization' of the nation among allies and adversaries" [English 2000].

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