

MITOSIS OF LIFE AIMS IN POLAND 2012–2016

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The concept of structural (Heider) balance is applied to moral issues. The data from the European Social Survey 2012–2016, collected on beliefs of Polish respondents in 21 issues, are used as initial conditions for the differential equations, which generically drive the system to one of balanced states. The obtained partition of beliefs is consistent with the split of Polish population into so-called Defenders and Explorers, known in the literature (J. Reykowski, *Disenchantment with Democracy: A Psychological Perspective*, Oxford University Press, 2020).

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1. Introduction

Research on intergroup relations from the perspective of social identity shows that there are psychological processes in a social group that affect the attitudes and behaviors of group members and can contribute to the development of intergroup conflict [1]. These processes are important for the formation of group social identity, as a result of which an individual perceives himself as a member of a particular group (We) and others as not belonging to it (They). This partition is coherent if the following four statements are true [2]:

- (i) a friend of my friend is my friend,
- (ii) a friend of my enemy is my enemy,
- (iii) an enemy of my friend is my enemy,
- (iv) an enemy of my enemy is my friend.

Otherwise, a cognitive dissonance is perceived [3]. To remove this stressful feeling, individuals can modify particular relations of themselves with others. Here, we are interested in the dynamics of these modifications.

In a nutshell, our approach can be summarized as follows. First, we extract the values of relations from the data available in the European Social Survey. Second, we introduce these data as initial values of the relations. Third, we initialize the dynamics of the system, as given by the set of differential equations, dedicated to remove the cognitive dissonance [4]. At the outcome, we obtain a partition of the system into two parts, where for each individual, the four above statements are true.

When translated into signs of links of a complete graph of social relations, the four statements above are equivalent [5] to a partition of the whole network to two groups, internally friendly and mutually hostile. In other words, all links between members of different groups are negative (hostile), and all links between members of the same group are positive (friendly). Such a configuration is termed ‘balanced’. The process of reaching balance has been termed ‘social mitosis’ by analogy to its biological counterpart [6]. As a special case, an internally friendly group which includes the whole network, the so-called ‘paradise’ [7], is treated as balanced as well.

As a rule, the process of evolution of a social network to reach a balanced state has been investigated as referring to relations either between individuals (as in [8, 9]), or between political entities (as in [10, 11]). Recently, the approach has been reformulated: instead of friendly or hostile relation, a link represents similar or dissimilar public reception of issues, which have been interrogated in polls [12]. In this scheme, the process of removal of cognitive dissonance is replaced by an identification of a partition of issues into two subsets which is as close as possible to the collected data. This partition has been used to construct two portraits of respondents, which represent different opinions on particular issues. The approach has been successful in the sense that the obtained partition [12] was consistent with the classic comfort hypothesis, known in the literature [13].

Preferences on particular issues can depend on local/national culture [14]. In this matter, Poland can be seen as a specific milieu. In a series of measurements [15], data on conservative and liberal beliefs have been compared for France, Germany, Poland, and Sweden. It has been shown in particular that Polish conservatives do believe in their parliament and are satisfied with democracy, which is opposite to the same issues in the remaining three countries. Further, summed conservatives and liberals in Poland gather about 72 percent of the adult population, which is outstanding when compared with 44 (Sweden), 33 (Germany) or 25 (France). Therefore, it makes sense to consider Poland as the subject of a separate research.

Here, the computational scheme [12] is applied to Polish data on how individuals at 16 different levels of education perceive different kinds of moral values. The data, collected in three rounds in 2012, 2014, and 2016, include 21 issues. It appears that 17 of them belong to the same group in all rounds, while the remaining 4 values show some variance. Our goal is to identify the partition of moral values, represented by the issues. In our opinion, this partition reproduces the basic split of political attitudes in Poland in these years.

Further, as demonstrated below, despite the differences mentioned above the results fit the classical partition of human mentalities into liberal and conservative ones [16]. A classic definition of the conservative attitude indicates a traditional worldview and a collectivist mentality. Its axial characteristics include belonging to specific communities based on “blood ties, shared language, territory, common worship (religion), common customs, common worldview (beliefs), and common traditions” [16]. On the contrary, liberal ideology is an individualistic mentality (emancipation of the individual), which should pay attention to the autonomy of thinking (independent connection to the truth) and moral autonomy (you cannot absolutely rely on the opinions of authorities) and create communities on different principles, taking into account the autonomy of individuals.

However, the ongoing process of social individualization means that this classic division does not exhaust the field of analysis. Nowadays, we can notice that the points that create opposition in the public debate are issues such as immigration, multiculturalism, opening borders or even the perception of democracy. These issues are clearly related to the social divisions existing in specific societies and are the result of social identity. The set of statements describing respondents’ attitudes that we proposed in our analysis refers to such individual, but socially rooted, identity choices. We believe that to analyze them, it is more appropriate to refer to the concept of social division into Defenders and Explorers [15, 16].

The text below is divided into three parts. Section 2 is devoted to details of the data and data handling. Section 3 provides our numerical results. Their discussion is given in the last section.

2. The data and data handling

The 2012–2016 European Social Survey (ESS) data used in the survey is publicly available and can be used for research purposes. Access to them is provided by the ESS Data Portal, which allows users to view, download, and analyze the ESS data in a manner consistent with the rules established by the ESS (<https://ess.sikt.no/en/?tab=overview>).

The survey is conducted every two years, allowing users to see the changes occurring over the analyzed period. The data is particularly valuable due to the way it is implemented. The methods used in the ESS are described in detail, making it possible to learn about the research process in which the data was collected (<https://www.europeansocialsurvey.org/methodology/methodology-overview>). Among other things, the data have been used to study the impact of social and institutional trust as part of social capital on subjectively assessed well-being [17] or analyses of the importance of feelings of dissatisfaction with life for political attitudes [18].

From the European Social Survey 2012–2016, data are selected on how Polish respondents are attached to 21 moral issues. The list of issues is formulated according to the scheme: ‘it is important to ...’ and includes the items listed in Table 1, the second column.

The answers are weighted according to the 6-point Likert scale. The respondents are also asked to specify their level of education. Unfortunately, different lists of options of education were used in different years. The same and most elaborate schemes of 16 levels were applied in rounds 2012, 2014, and 2016. Therefore, our considerations are limited to these three rounds.

The outcome of the poll is a matrix $a(i, e)$, where $e = 1, \dots, 16$ is the number of education level, $i = 1, \dots, 21$ is the number of issue, and $a(i, e)$ is the support of the i^{th} issue in the e^{th} cohort. Our aim is to identify a balanced state which is most close to the data, encoded in $a(i, e)$. At first, we have to evaluate the mutual similarity between the issues. For this purpose, we calculate the mean values of the support $\bar{a}(i)$, averaged over education levels, the related variances σ_i^2 , and the Pearson coefficients $r(i, j)$ between the issues

$$r(i, j) = \frac{\sum_e [a(e, i) - \bar{a}(i)] [a(e, j) - \bar{a}(j)]}{\sqrt{\sigma_i^2} \sqrt{\sigma_j^2}}. \quad (1)$$

Next, these Pearson coefficients are used as initial conditions of the differential equations, which are the mathematical realisation of the four statements (a friend of ...), given in the introduction

$$\frac{ds(i, j)}{dt} = [1 - s^2(i, j)] \sum_k s(i, k) s(j, k). \quad (2)$$

There, $s(i, j)(t = 0) = r(i, j)$. This set of equations, proposed for the first time in [4], has been shown to lead generically to a balanced state [4, 12]. The matrix s is symmetric, as its input, *i.e.* the correlation function, is symmetric by definition, and its element $s(i, j)$ is a counterpart of an interpersonal relation between the actors i and j in the Heider balance problem.

The action of Eq. (2) is to convert the matrix $r(i, j) = s(i, j)(t = 0)$ to the final state which could be symbolically written as $s(i, j)(t = \infty)$ (we note that the time to get final state $s(i, j) = \pm 1$ is reasonably short). A positive sign of $s(i, j)$ indicates that the issues i and j are likely to be in the same group. This positive relation is enforced if other issues k are either in accordance with both i and j or are incompatible with both of them. An accordance of an issue k with i and its incompatibility with j drives the relation $s(i, j)$ toward negative values. The set of equations (2) has been proved [12] to lead to a balanced state $s(i, j) = \pm 1$, which is most close to the initial unbalanced state $s(i, j)(t = 0)$ [12]. In this sense, the final balanced state $s(i, j)(t = \infty)$ is optimal with respect to its minimal distance to the data $a(e, i)$. As such, it can serve for sociological interpretations.

3. Results

In Table 1 we show the issues which, as the result of the calculations using Eq. (2), appear in the same sets in particular rounds. To specify these results, let us consider the first round of data, collected in 2012. In this case it appears that the issues numbered as 1–7 belong to the same subset. The same is true in the two rounds 2014 and 2016. Further, the second part of issues contains those numbered as 11–21 in all three rounds. To mark these results, we label the first part of issues as A, and the second — as B. However, as shown in the Table 1, the remaining issues 7–10 in some rounds belong to the first, in other rounds — to the second part.

As stated above, the set of Eqs. (2) generically drives the system to one of balanced states. In our case, for each of the three rounds 2012, 2014, and 2016 we get a partition of the set of issues in two parts, marked in the last three columns of Table 1 as A or B. As we see, there are two sets of issues (Nos. 1–6 and 11–21) with their composition repeated in all three rounds. These sets include 17 out of 21 issues. A look at these two sets makes clear that the set A (security, tradition, obeying rules *etc.*) fits to a more conservative view, while the set B (freedom, fun, adventures *etc.*) can be associated rather to liberal position. Therefore it is straightforward to equate the set A with Defenders, and the set B with Explorers.

Explorers and Defenders differ greatly in their relatively stable cultural, religious, and psychological characteristics which constitute the descriptive referents of belonging to these categories [15]. Being an Explorer or Defender influences the desired form of democracy in a population. Defenders are clearly more home-bound and religious than Explorers, although this difference varies from country to country. Explorers support an open definition of belonging and do not feel threatened by outsiders (groups defined on the opposition we/they). They also consider themselves well represented,

Table 1. In columns: the ordinal number, the issue, and the appearance of the issue in groups A or B, in three rounds: 2012, 2014, and 2016.

No.	It is important	2012	2014	2016
1	to live in secure and safe surroundings	A	A	A
2	to follow traditions and customs	A	A	A
3	to behave properly	A	A	A
4	to do what is told and follow rules	A	A	A
5	to be humble and modest, not draw attention	A	A	A
6	to get respect from others	A	A	A
7	to care for nature and environment	A	B	A
8	that people are treated equally and have equal opportunities	A	B	B
9	to be loyal to friends and devote to people close	B	B	A
10	that government is strong and ensures safety	B	B	A
11	to try new and different things in life	B	B	B
12	to make own decisions and be free	B	B	B
13	to seek fun and things that give pleasure	B	B	B
14	to be rich, have money and expensive things	B	B	B
15	to seek adventures and have an exciting life	B	B	B
16	to think new ideas and being creative	B	B	B
17	to have a good time	B	B	B
18	to help people and care for others well-being	B	B	B
19	to show abilities and be admired	B	B	B
20	to be successful and that people recognize achievements	B	B	B
21	to understand different people	B	B	B

i.e. they feel marginalized less often, are more satisfied with democracy in their country, and trust politicians and political institutions. On the other hand, Defenders are more likely to support a narrow definition of belonging, feel more threatened by outsiders and marginalized by society, are more dissatisfied with democracy in their country, and have less trust in political institutions.

Four issues on our list (Nos. 7–10 in Table 1) are labile. They concern the approach to egalitarianism and ecology. Studies on these issues led us to the conclusion that the verbal descriptions used in the forms were so general that they allowed for different interpretations by both groups of

respondents. We observe such different narratives, especially in relation to ecology in public discourse. According to Heywood [19], environmentalism cannot be attributed to dichotomous divisions into left and right, because it has become a carrier of a new set of concepts and values explaining reality and redefining the relationship between man and nature.

4. Discussion

The structural balance, *i.e.* the partition of the network into no more than two groups, can be seen as a special case of a more general fragmentation into two or more groups [20]. The mechanism which triggers the bipolarization is encoded in statement (*iv*) in our Introduction: “enemy of my enemy is my friend”. We note that it is by no means universal, as both examples and counterexamples exist [11, 21]. On the other hand, even for the dynamics which generically drive the system to a balanced state, some stationary imbalanced states exist [10, 22]. For sure, the same reservations are valid in the case of balance of a set of beliefs in moral values. We do not claim that the bipolarization applies automatically here. However, actually values are rarely neutral, as they contribute to systems, where they are unified, simplified, sorted out, and made coherent in competing political discourses [23, 24]. Clearly, the partition into “Truth” and “Lie” is most simple, mentally and emotionally comfortable, and consistent with all-explaining “We” and “They”. Accepting this, we are prone to accept a person as a friend only because she or he hates our enemies. To conclude, the cause of bipolarization of moral values is the same as for interpersonal relations: our willingness to remove a cognitive dissonance, induced by the incoherent informational environment.

Summarizing, the nature of the differences between the distinguished groups of Defenders and Explorers means that there is no prospect of leaving such a polarized social structure. In recent decades, individual values have become more and more important for political orientations [25, 26]. Political issues are becoming more complex and political actors are becoming more interdependent. One of the methods of winning voters is to arouse emotions by appealing to values. Our analysis shows that the division reported here is relatively durable. It is only the mutual proportions of these two groups in particular societies, which are subject to change. The consequence of such social division in the sphere of politics is a constant feeling of lack of representation and exclusion of one part of society. Since this division is based on values and emotions, it takes the form of a permanent conflict, which is not conducive to finding constructive solutions to the global and local challenges that await us. Therefore, the emergence of the four labile issues that are associated with such challenges could constitute the beginning of a platform for social consensus on a broader social scale.

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