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The Power of Silence?
Opinion Contagion and the Surprise of the Polish 2005 Parliamentary and Presidential Elections*

Abstract: This paper investigates opinion contagion in collective behaviour using threshold model (Granovetter (1978)). The theoretical background is the spiral of silence concept developed by Noelle-Neumann (1974), arguing that people only assert their opinions if they perceive a minimal support from a relevant proportion of others. We apply the model to explain the dispersion between pre-elections preferences and the final results of the Polish parliamentary and presidential elections in 2005. It is shown that the minority opinions were more widely-held than was declared in opinion polls as a consequence of different distributions of the threshold values of opinion assertion.

Keywords: spiral of silence; threshold model; opinion assertion.

Introduction

Public opinion polls have become one of the most important and widely used means of scanning the public mood, as well as its sudden and apparently inexplicable changes on the eve of national elections. There are many "irrational" elements of public behaviour, which account for why pre-election poll results often prove not to match the actual preferences expressed in official results. The polls' role is not to predict the final results of elections but to measure the intention to vote.[1] This is based on the sample of voters who are usually asked the question: "If the election were held today, which party you would vote for?" There are, however, always a number of respondents, who

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[1] Vote divisions in polls on any given day in advance of the election do not directly translate into the final vote outcome. However, the precision of pre-election polls is usually judged against official results (Callegaro and Gasperoni 2008). Because of that pre-election polls are often referred to as prediction and not only in media. See for example "the failure of virtually all pollsters to predict outcome…" (Callegaro and Gasperoni 2008: 148), "Respondents were asked for whom they would vote, and their answers served as a foundation for predicting the results of the forthcoming elections." (Sułek 2008: 132) or"By our tests, the IEM election markets are not better than trial-heat polls for predicting elections. In fact, by a reasonable as opposed to naive reading of the polls, the polls dominate the markets as an election forecaster" (Erikson and Wlezien 2008: 213).

give no definite answer ("I don't know") or choose not to answer. There are various ways to deal with the "silent masses:" one is to give them a proportional preference according to the measured preferences. This method can be, nevertheless, misleading as we are trying to show below using the spiral of silence theory.

In her pioneering book, Elisabeth Noelle-Neumann (1980) offered a scientific explanation for the formation of public opinion. Her spiral of silence theory has had a great impact on public opinion research, as is shown not only by the numerous theoretical studies which have been published so far but also by attempts to translate the theory into operational models (e.g.: Scheufele 1999; Scheufele and Moy 2000).

The present paper introduces a simulation developed by Granovetter (1978) to model opinion contagion in collective behaviour, which is a key issue in the spiral of silence theory.

The paper is organised in the following way. First, we introduce the basic assumption of the spiral of silence theory. The third part presents the threshold model of collective behaviour together with the important problem of how to measure thresholds. In section 4 we apply the model to the Polish parliamentary and presidential elections in 2005. Both of them finished with a surprise victory for the Law and Justice Party (PiS) and, in the case of the presidential elections, Lech Kaczyński. To the very last day before the vote the polls indicated a preference of the voters for the opponents, the Civic Platform (PO) and its chairman Donald Tusk for president. With the help of this model, we show that it is possible for a public opinion poll to measure a minority opinion as being higher than it is in the real distribution of opinions because of the different distributions of the thresholds of opinion assertion. Thus, the paper argues that the spiral of silence theory offers a valid explanation for the electoral behaviour observed: namely, that people hid their true political opinions from the polls.

We stress, however, that the explanation is valid under certain premises, which are set by the applied model. Bearing in mind these limitations, the last part of the paper discusses the problems of the practical applicability of the model as well as giving a critical evaluation of the theory.

The Spiral of Silence

In a more recent work, Noelle-Neumann differentiates between two concepts of public opinion: (1) public opinion as rationality, which makes it "instrumental… in the process of opinion formation and decision-making in a democracy;" and (2) public opinion as social control, where "its role is to promote social integration and to ensure that there is a sufficient level of consensus on which actions and decisions may be based" (Noelle-Neumann 1995: 34). Noelle-Neumann bases her theory on this second concept of public opinion, and she argues that consensus is motivated by individuals' fear of social isolation.

The spiral of silence theory is based on three major assumptions. (1) The majority of people have a quasi statistical perception of the formation of public opinion.

(2) Perception of public opinion influences opinion assertion and through this, communication processes. The camp that feels the support of the majority will be more courageous, self-confident and therefore more assertive and visible. The other camp, where the people think that they are in a minority, will, on the contrary, feel insecure and withdraw. Some of them will sooner or later be effectively silenced. (3) This change in communication behaviour will modify the conditions of perception. The withdrawing camp will seem to be smaller, while the more confident camp will appear to be greater than its actual size. This wrong optics of the perception of public opinion will further increase the differences in opinion assertion between the members of the two camps and the wrong perception of the expected formation of public opinion: on the one side we can observe the spiral of silence, on the other side the increasing spiral of opinion assertion.

Thus, the theory assumes that people do not express their opinion if they do not perceive minimal support from the relevant population groups. This is what Noelle-Neumann calls the spiral of silence: it can happen that the people who hold an opinion A in fact constitute the majority, but in the case of unfavourable communication conditions appear to be the smaller camp. Naturally, a "loud" camp is capable of changing the individual's perception of public opinion, and thereby they can appear to be bigger than their actual size in a given country or community. The "louder" camp can thus set into motion the spiral of silence, and therefore the camp of the actual majority can appear to be in the minority in the eye of the public.

On the basis of these arguments Elisabeth Noelle-Neumann (1977) explained the surprise of the 1965 parliamentary elections in the Federal Republic of Germany. According to the polls, the voters' preferences for the two big parties—the CDU and the SPD—were very close. That's why it came as a surprise that CDU won by 8%. According to Noelle-Neumann, one explanation for the wrong forecast could be the silence of many CDU-supporters, who thought that they represented the minority opinion.

We cannot include here all the many criticisms of the spiral of silence theory.[2] We only single out two points which are relevant to our later discussion of the use of the threshold model. One is the problem of dual opinion climates, which Noelle-Neumann recognizes but mainly attributes to the influence of the mass media. The question is how people actually perceive public opinion. It can happen that in the individual's network supporters of opinion A constitute the majority, while nationally there is a majority of the supporters of opinion B. People in this network can be still convinced that the majority supports opinion A, and therefore they can be louder in the local community. Angelusz (2000) distinguishes four types of perception: 1. realistic perception (both camps see their correct size); 2. the case of parallel underestimation (both camps perceive themselves to be in the minority); 3. mirror perception (both camps perceive themselves to be in the majority); 4. inverse perception (the majority camp perceives itself to be the minority, while the minority camp perceives itself to be the majority). Both the third and the fourth cases can be explained by the different

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[2] For an overview see Scheufele and Moy (2000).

social networks in which individuals are embedded. Furthermore, there is actually a big difference among the threshold values of individuals, which are dependent on many variables such as age, gender, education, occupation, etc. (Scheufele and Eveland 2001). Scheufele and Moy (2000) argue that culture can also be an important variable, determining the degree to which individuals are susceptible to perceptions of opinion climates. They argue that in individualistic cultures consistency between private self-image and public self-image is highly valued, whereas in collectivistic cultures individual opinions are more dependent on the social environment. One has to say, however, that many historical examples can be quoted to challenge this dichotomy. (Germany, for instance, belongs to the individualistic cultures, but still public and private opinions differed markedly in the GDR and many other Eastern European socialist countries). They suggest that the phenomenon that Noelle-Neumann calls hardcores or avant-gardes should be taken into account in future empirical research.

Threshold Models of Collective Behaviour

Threshold models of collective behaviour are based on the assumption that individual behaviour depends on the number of individuals who already show this behaviour. Granovetter's (1978) threshold model was a pioneering attempt to formalise this kind of behaviour using the example of riots. The model assumes that individuals are willing to act rationally in order to maximize their utility. "The threshold is simply that point where the perceived benefits to an individual of doing the thing in question (here, joining the riot) exceed the perceived costs" (Granovetter 1978: 1422). Each individual has a threshold such that he or she will act only if a given number of others—defined by a threshold—have already acted. For example, a riot threshold is the percentage of people who join the riot before one would also decide to join. A person with 0% threshold would be a leader of a riot: he or she does not need to see other people join before. On the other hand, someone with a high threshold (i.e. 90%) is very unlikely to join the riot. The final number of people who decide to make either of two decisions (here to join the riot or not) depends on the distribution of thresholds in a population. Let's consider 10 people: one with threshold 0, one with 1, one with 2 and so on up to the last with threshold 9. The action is started by an individual with threshold 0, he activates the second with threshold 1 and the final outcome is that all 10 people are activated. But if among these 10 people the distribution of thresholds is different i.e. instead of one with threshold 1, two individuals with threshold 2, the action will cease after the first individual with threshold 0.

An analogous case is the contagion of the public assertion of the opinions. The level of public support from the population that the individual needs for the public assertion of his or her opinion is precisely the threshold value that Granovetter uses in the analysis of riots. The level of opinion assertion thus largely depends on the distribution of the thresholds in a given population (Krassa 1988). According to Noelle-Neumann, because of the fear of social exclusion people assert their opinion loudly only if they see a minimal level of support from others.

In our model we have two contradictory opinions (A and B) which are present in society in a given ratio. The use of two opinions instead of one is explained by the fact that in this way the opinions can be interpreted as preferences for one of the two major rival parties competing in an election. For the perception of the ratio of opinions we do not take into account the fact that the opinions of different people are perceived by a given person with different weights. We give the same weight to every single opinion perceived. In this way we construct a rational model with complete information.

The simulation creates a population of 1000 people (an usual pre-election sample of potential voters), and in the first step one of the opinions, either A or B, is assigned to each member of the population with the proper probability according to the given parameters. Every person is also assigned a threshold level which indicates the minimal ratio of people sharing the person's opinion that must be perceived by the person to make him publicly assert his opinion.

The simulation itself is the iteration of one step: the people who have a lower threshold level than the proportion of people sharing this opinion in the previous step will assert their opinions, the other people will not. The opinion of each person is given and constant from the beginning. Lazarsfeld et al. (1948) describing the hierarchy of stability, put the election preferences at the top as being very stable and difficult to be influenced by new experiences, information etc. This premise can of course be problematic in a "real-life" campaign situation. The spiral of silence theory, however, presupposes that people have their opinion, only that they don't assert it if they don't feel a certain level of social support. The impact of the campaign is, however, taken into account insofar as the visibility of each camp influences people to assert, or, on the contrary, hide their opinions.

The proportion of people asserting each opinion at a given moment thus depends on the proportion of people asserting the given opinion in the previous moment, and on the distribution of the threshold levels within the group of people sharing the given opinion.

$$P_t = f(P_{t-1}F(V_i)) \qquad (1)$$

Where P_t and P_{t-1} stand for the ratio of people asserting a given opinion in the t-th and $(t-1)$-th moment (that is, the probability of asserting one's opinion), and $F(V_i)$ is the distribution function of the threshold levels of those who share the i-th opinion. The threshold levels can be interpreted as percentages, with the threshold value for each person generated by a random number generator from a uniform distribution between 0 and 100 percent by default. The input parameters of the model are the proportion of each opinion and the minimum and maximum values of the threshold distributions for each group of people with different opinions separately, so that the willingness to express opinions can be different in the two groups. When modifying the distributions of the threshold levels, we always take care that the difference between the maximum and the minimum value should be equal in the two opinion-groups. This is necessary to ensure that the height of each density function is equal.

How can we measure thresholds?

The main technical difficulty lies in the determination of the actual distribution of thresholds. In case of the adoption of an innovation, threshold distribution is measured according to the exact exposure time of adoption (Valente 1996). Exposure is understood here as the proportion of the adopters in an individual's personal network: for example, if a doctor starts to prescript a new drug only after all of the doctors in his network adopted it, he has an adoption threshold of 100%.

Another way to determine the threshold is to ask people directly about their willingness to start an activity. Taylor (1984) used this method to determine thresholds in his analysis of residential segregation. White and black interviewees were asked whether they would move out of their residence if the proportion of the two groups changed. If a white respondent accepts black/white ratios of 9/1, 7/3, 5/5, and so on, but rejects ratios of 10/0 and 1/9, he has a lower threshold of 10 percent (at least 10% of the neighborhood population has to be white) and an upper threshold of 90 percent (at most 90 % of the neighborhood population should be white).

Krassa (1988) determines the individual's threshold as a function of the intensity of the individual's opinion in issue and the risk aversion or fear of social isolation. Threshold rises with risk aversion and the lack of the interest in the subject. Thus, thresholds can be determined indirectly through determinants such as social class, education, occupation, social position etc.

Noelle-Neumann tried to measure individuals' readiness to stand up for their opinion as well as to determine factors, which negatively or positively influence opinion assertion. Interviewees were asked to answer the question: "Assuming that you have five hours of train travel ahead of you, and somebody in your compartment begins to talk about… Would you like to talk with this person or rather not, knowing that he or she is arguing for party X" (Noelle-Neumann 1977: 150). If one is ready to join a conversation about the preferred party only with the supporters of the party, he has a higher threshold level than the respondents who are ready to engage in a conversation with their opponents. Noelle-Neumann found significant differences in opinion assertion among the members of different social groups. The "loudest" interviewees were male, educated, young, and urban residents with a high income.

In the next section we will demonstrate the applicability of the model in practice using the example of the Polish parliamentary and presidential elections in 2005. As discussed above thresholds are difficult to be measured. In the absence of relevant data we will assume that PO's supporters had relatively lower levels of minimum threshold than PiS's supporters, and we will show the results of simulations with all possible distributions of thresholds.

The Application of Threshold Model to the Polish Elections of 2005

Parliamentary elections for both houses of the Parliament of Poland were held on September 25, 2005. The election resulted in a sweeping victory for two parties of

Table 1

Summary of the 25 September 2005 Sejm and Senate Election Results

Parties	Votes	%
Law and Justice (PiS)	3,185,714	27.0
Civic Platform (PO)	2,849,259	24.1
Self-Defence of the Republic of Poland (Samoobrona RP)	1,347,355	11.4
Democratic Left Alliance (SLD)	1,335,257	11.3
League of Polish Families (LPR)	940,726	8.0
Polish People's Party (PSL)	821,656	7.0
Total (turnout 40.6 %)	11,804,676	

the centre-right, the conservative Law and Justice (PiS) and the liberal-conservative Citizens Platform (PO) (see Table 1).

Presidential elections were held in Poland on 9 October and 23 October 2005. During the first round, in which voter turnout was 49%, neither Tusk nor Kaczyński received 50 percent of the votes. One week before the second round (23 October), pre-election polls had attributed an 8 percentage point lead for Tusk. Eventually, however, it was Kaczyński who defeated his opponent; getting 54.04% of the vote (see Table 2). Voter turnout was 51%.

Table 2

Summary of the 9 October 2005 Polish Presidential Election Results

Candidate	Votes 1st round	%	Votes 2nd round	%
Lech Kaczyński	4,947,927	33.1	8,257,468	54.04
Donald Tusk	5,429,666	36.3	7,022,319	45.96

Both parliamentary and presidential results were a surprise as the official poll institutions to the very end indicated a voter preference for Civic Platform and its chairman Donald Tusk for president. In Figures 1 and 2 the trends of voter preferences in the parliamentary and presidential elections are shown (the mean value of 4 main opinion research agencies[3]). The polls of each of the agencies were conducted on a representative sample of 1000 adult Poles. The maximum statistical error for such a sample is $+/-3.2\%$. Most of the surveys were conducted by interviewing people in their homes or calling them on the phone (mobile or private). The PGB survey collected information by face-to-face interview conducted in public places.

From the beginning of August all the research institutions estimated that most interviewees intend to vote for the PO.

If we consider the presidential election, we face a similar situation. Preferences according to the mean value of surveys of the main agencies a week before the second turn were as follows: Tusk—54%, Kaczyński—46%. PGB was the only institute which survey match the election of Lech Kaczyński, giving him 50.2% on the day before the election.

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[3] OBOP (The Public Opinion Centre), CBOS (The Public Opinion Research Centre), GFK Polonia, PGB (Polish Research Group)

Figure 1
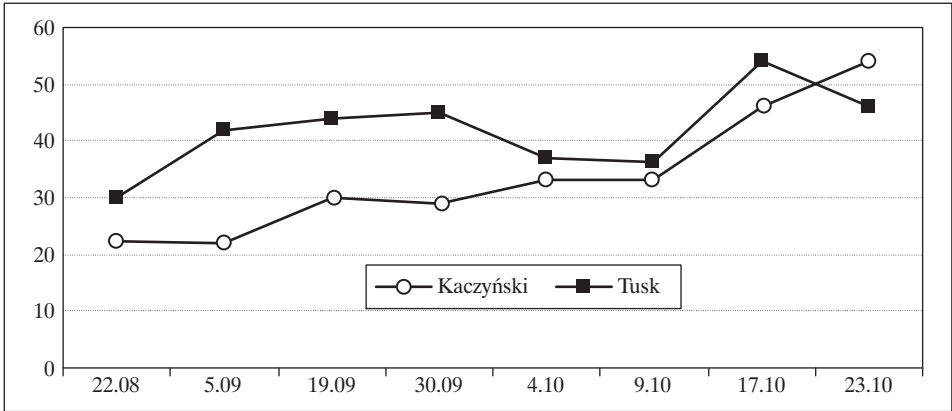
Voter Preferences in the Parliamentary Elections
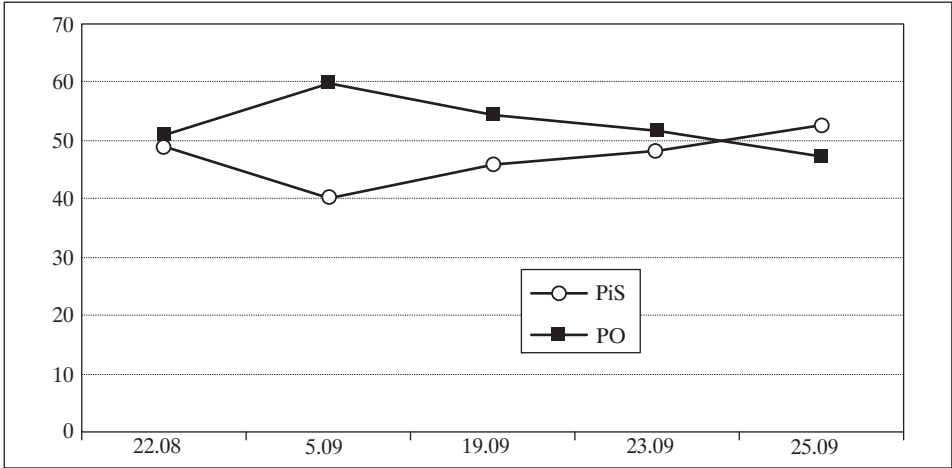
* Based on the mean value of 4 main poll agencies.

Figure 2

Voter Preferences in the Presidential Elections

* Based on the mean value of 4 main poll agencies.

Pollsters explained the low accuracy of the pre-election polls (measured as the difference between official results and pre-election preferences) with the substantial number of "silent" respondents. The group of interviewees who were uncertain or refused to give a definite answer was estimated at between 11 and 19%. The failure of the polls was also explained by an error in the sampling method: telephone interviews were claimed to overestimate supporters of Tusk and the PO.

However, with the help of the spiral of silence theory, we can give an alternative explanation. We argue that because of the strong conservative character of PiS and

Kaczyński it is unlikely that people who decided to vote for them made up their mind on the last day. Instead, they preferred not to tell their true opinion to the pollsters, a behaviour which can be explained through the spiral of silence. Tusk and Civic Platform had greater visibility because they were preferred by the media. Justice and Law and Kaczyński, on the contrary, were represented as a party of the bigoted, uneducated and old "village" people. It is reasonable to assume that people were reluctant to admit their preference for a "backward" party. Our argument that the majority preference was perceived as minority is supported by the official surveys (Figure 3).

Figure 3

"Who is Going to Win the Presidential Election?"—Survey of Voters' Predictions
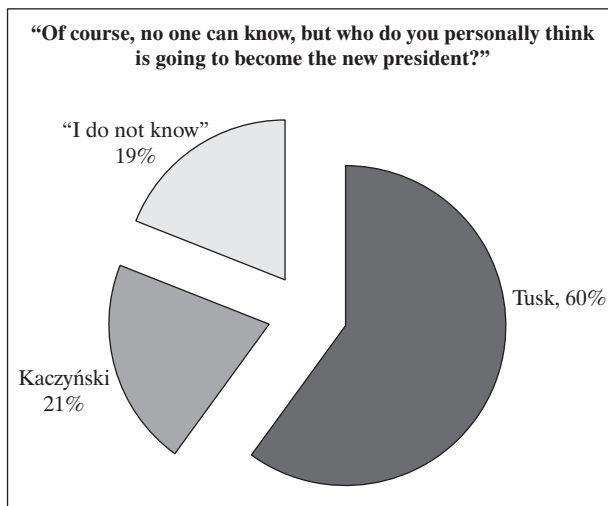
Source: CBOS, survey conducted between 13 and 16 Oct 2005 on a representative sample of 1003 adult Poles, see more at http://cbos.pl

One week before the second round of the presidential elections only 21% of the respondents believed that the winner would be Kaczyński. According to the measured social perception, the probability of a Tusk victory compared to a Kaczyński victory was 3 to 1. Indeed the winning candidate was perceived to have minority support.

We start the analysis from the parliamentary elections. We take the election results as a starting point of our calculations, assuming that the factual ratios of party preferences were equal to the ratios of the votes for the party lists observed in the elections. We want to know by using recursion analysis whether it was possible to measure different preferences in the pre-election period.

The two opinions in the model correspond to the preferences for PiS or PO (preferences for other parties are not considered here). The ratio of the votes for the party lists was: 52.8 for PiS and 47.2 for PO. However, we assign different threshold distributions to the supporters of the two parties. We assume that PO voters are more willing to assert their opinion and have a lower minimum threshold.

Because we do not possess the information on the distribution of threshold in the society we rely in further analysis only on simulations. We have run simulations[4] of all possible combinations of differences between respective threshold levels of the two groups (from 5 to 50, increasing in 5% increments) and the dispersion of distribution (range between threshold maximum and minimum for a given group: from 5 to 95, increasing in 5% increments). In Table 3 we have listed sets of equilibriums with various combinations of the dispersion of distribution for a difference of 5%, and in Table 4 for a difference of 10%.

Table 3

Simulation of the Diffusion of Opinion for the Parliamentary Election with the Difference Between Both Parties' Thresholds of 5%

			Threshold maximum									
		PO PiS	95 100	90 95	85 90	80 85	75 80	70 75	65 70	60 65	55 60	50 55
Threshold minimum	PO PiS	**0** **5**	100 0	51.2 48.8	49.2 50.8	50.4 49.6	45.8 54.1	39 61	35 65	33 67	36 64	45 55
	PO PiS	**5** **10**	100 0	100 0	51.6 48.4	49 51	49 51	39 61	25 75	32 68	35 65	43 57
	PO PiS	**10** **15**	100 0	100 0	100 0	100 0	100 0	0 100	0 100	0 100	32 68	37 63
	PO PiS	**15** **20**	100 0	100 0	100 0	100 0	100 0	100 0	0 100	0 100	0 100	32 68
	PO PiS	**20** **25**	100 0	100 0	100 0	100 0	100 0	100 0	0 100	0 100	0 100	0 100
	PO PiS	**25** **30**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	0 100	0 100	0 100
	PO PiS	**30** **35**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	0 100	0 100
	PO PiS	**35** **40**	100 0	100 0	0 100	100 0	100 0	100 0	100 0	100 0	0 100	0 100
	PO PiS	**40** **45**	100 0	100 0	100 0	47 53	100 0	0 100	100 0	0 100	100 0	0 100
	PO PiS	**45** **50**	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100	0 100

Rows indicate the values of maximum thresholds, while columns indicate the minimum. For example, the first row and first column of Table 3 show an analysis assuming that the thresholds for PO are normally distributed between 0 and 95, and for PiS between 5 and 100. The exact steps of the diffusion of opinion are shown in Figure 4.

Step "0" indicates the day of election. From step 3 the proportion of PO voters, who assert their opinion, exceeds that of PiS voters. The equilibrium in the cell in

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[4] We want to thank Aleksandra Parteka for her help in writing Stata's code for the simulation. The codes are available from the authors upon request.

Table 4

Simulation of the Diffusion of Opinion for the Parliamentary Election with the Difference Between Both Parties' Thresholds of 10%

		Threshold maximum								
	PO PiS	**90** **100**	**85** **95**	**80** **90**	**75** **85**	**70** **80**	**65** **75**	**60** **70**	**55** **65**	**50** **60**
PO PiS	**0** **10**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	62 38
PO PiS	**10** **20**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0
PO PiS	**20** **30**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0
PO PiS	**30** **40**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0
PO PiS	**40** **50**	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0

(Threshold minimum is indicated along the left side of the table.)

Figure 4

Simulation of the Diffusion of Opinion for the Parliamentary Election with the Distribution of Thresholds for PO (0,95) and PiS (5,100)

Legend: —◆— PiS within all; —◇— PiS within expressed opinions; —▲— PO within all; —△— PO within expressed opinions; —✳— Silent
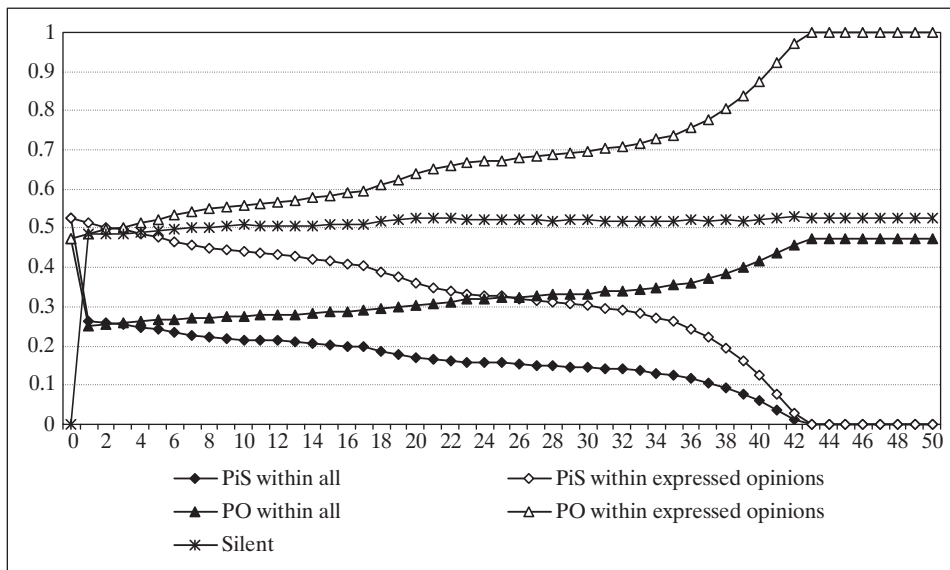
Table 3 indicates the proportion of people, who assert their opinion (either *A* or *B*) after 50 steps. Here we have the equilibrium of 100 and 0, showing a situation, where the minority opinion seems to enjoy an absolute hegemony.

For the sake of a clear overview, we present here only the results of the simulations, where the differences between the analogous threshold levels were 5 and 10%. If the

difference exceeds 10%, all simulations end with 100% of PO voters asserting their opinions and all PiS supporters remained silent.

The results of all possible combinations indicate that in the whole number of 210 simulations 75% was in favour of our model.

We have conducted the same analysis for the presidential election. Figure 5 shows the diffusion of opinion assuming that the thresholds of the supporters of Tusk are normally distributed between 20 and 50, and that of Kaczyński between 30 and 60.

Figure 5

Simulation of the Diffusion of Opinion for the Presidential Election with the Distribution of Thresholds for Tusk (20,50) and Kaczyński (30,60)
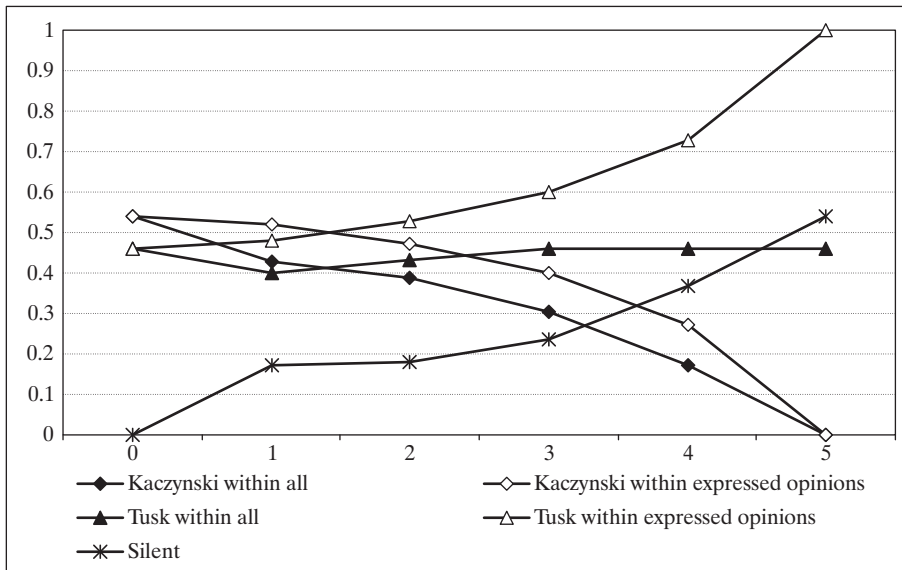
After a few steps, the proportion of the supporters of Tusk, who assert their opinion, clearly exceeds Kaczyński's supporters. If we consider the 2nd step in Figure 5 (Tusk 54%, Kaczyński 46%), it perfectly reflects the measured voter preferences one week before the second round (Fig. 2). Additionally, the silent group of 17.4% corresponds to the voters, who answered "I do not know," in the surveys. Again, we have run 210 simulations[5] with all possible pairs of the dispersion of distribution and difference between the respective thresholds of the supporters of the two candidates. The results are very similar to that of the previous calculations. If the difference between the corresponding thresholds is equal or exceeds 10%, then all simulations show that the proportion of Tusk's supporters, who express their opinion, clearly exceeds that of the Kaczyński's supporters who decided to be silent in the pre-election period.

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[5] To save space, we do not show the results, but they are available from the authors upon request.

Discussion and Conclusion

In this article we wanted to show that the application of the threshold model to the 2005 Polish parliamentary and presidential elections can explain the dichotomy of pre-election polls and official results. Moreover, this is in line with the Polish sociologists' explanation and intuitive—public interpretation of the official result of these elections.[6]

Of course there are many more examples of disparity between pre-election polls and final results. To mention but a few: the Hungarian parliamentary elections of 2002 likewise finished with the surprise victory of the Socialist Party, although the pre-election polls indicated a victory for FIDESZ (Young Democrats).

In the British General election of 1992 the pre-election polls indicated the victory of the Labour Party (under Kinnock) over the conservatives (under Major). In the event the Conservatives won their fourth general election in a row. In 2006 during the Italian parliamentary election Berlusconi accused the Italian pollsters of being biased in favour of the central-left. In fact, the central-left coalition won the election with a narrow margin of 0.1 percent of votes instead of the 3 to 4 percent, which was the voter's preferences expressed in the pre-election polls (Callegaro and Gasperoni 2008: 148). Last but not least, we can also mention here the 2007 Polish parliamentary elections, where the pre-election polls measured the preference for PiS to be 30% and for PO 28%. Eventually, PO won by 41,5%.[7]

A dichotomy between pre-election polls and official results can be of course explained through several factors: sampling error, undecided voters, specific context such as the famous Sheffield rally in the British case, where Kinnock appeared triumphant. This, given the British national character may well have put many voters off (Dyson 1994).

Our article sought to show that there is another possible explanation for the wrong forecast, which is supported by the spiral of silence theory: namely, that many respondents who believed that they held the minority opinion were reluctant to admit their preferences to pollsters putting the "spiral of silence" into motion.

Concerning both the practical applicability of the model and its theoretical assumptions however, we can raise some criticisms.

First, our simple model does not take into account the network distribution of the perception of opinions, namely that individuals do not uniformly perceive the distribution of opinions. The perception of individuals is thus influenced by the distribution of opinions that they see in their own social networks. In order to expand our model, it would be important to take into account "dual opinion climates," which can result in "optical misperceptions."

The second problem is that the relationship between a tie and opinion dynamics is not so direct and obvious as the model assumes. It can happen that A is a good friend of B but it does not matter to A whether or not B supports the X cause

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[6] We want to thank an anonymous referee for pointing this out.

[7] Given the aggressive rhetoric of the Kaczyński's government, we can reasonably assume that this time many PO supporters chose to be silent in the pre-election polls.

because A considers B to be a born loser. At the same time A can be influenced by a person whom he or she has never met (e.g. a television reporter, politician or football player). A further practical difficulty is the identification of the social groups in A's network which negatively influence his opinion assertion. In reality, it can happen that precisely those individuals connected with strong ties have a negative effect on each other (the most typical case is the revolt of sons against fathers). Moreover, the model makes no distinction between strong and weak ties. Note that whether contagion is faster in the case of stronger or weaker ties is questionable. Chwe (1999) shows that a strong-tie structure is advantageous while Macy (1991) finds the opposite. Chiang (2007) adds that not only is the strength of ties important, but also the threshold values of neighbours. He finds that at the beginning participation levels increase when neighbours have different thresholds, but a further increase in the heterogeneity of neighbour networks causes the diffusion of opinion to stop.

Furthermore, it is not necessarily true that willingness to express an opinion depends exclusively on perceived social support. The hypothesis that opinions are constant is likewise problematic. In the model, the change in the perceived distribution of opinions was only the result of a change in the proportion of people who expressed this opinion—while the ratio of actual supporters did not change. In reality, people's opinions change as well.

Last, with respect to opinion assertion, the model assumes that if people are willing to assert their opinion, they will say what they actually think—although in public opinion polls the separation of public and private opinions is a well-known phenomenon, when under a certain normative pressure individuals assert in public an opinion different to their internal conviction, to which they listen when they actually vote.

Finally, it can be also questioned whether people's behaviour is contingent on others or is influenced by some exogenous factor as in the case of umbrellas: "Thus, if at the beginning of a shower a number of people on the street put up their umbrellas at the same time, this would not ordinarily be a case of action mutually oriented to that of each other, but rather of all reacting in the same way to the like need of protection from the rain" (Max Weber [1921] 1968: 23).

We believe that further development of threshold models is possible only through multidisciplinary research. The need for a combination of quantitative and qualitative methods, which would take into account not only the complex relationship between ties and opinion dynamics but would also consider the wider social context, is beyond doubt. While simulations operate in a context-free (or "controlled") environment, in reality where and which cause is supported by a "visible" majority is of no little consequence.

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