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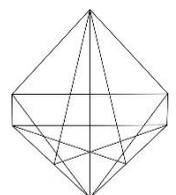
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Response Feedback Algorithm

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# Do Polls Influence Opinions?

Testing the Spiral of Silence Using a Dynamic Response Feedback Algorithm

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## Abstract

Opinion polls may inadvertently affect public opinion itself as people change attitudes after learning what others think. A disconcerting possibility is that opinion polls have the ability to create information cascades or spirals of silence where the majority opinion becomes increasingly larger over time. Testing this hypothesis on attitudes towards Syrian refugees and mandatory measles vaccination, survey experiments are performed on a population based web panel using a novel automated procedure that measure the influence of an initial poll over subsequent polls. No indications of spiraling opinion gaps over time between the treatment and control groups are identified. The polls do however trigger a cognitive response as the treated respondents become more opinionated and alter their justification for their answers.

*Keywords:* Spiral of silence, impersonal influence, bandwagon effect, Syrian refugees, survey experiment, dynamic response feedback algorithm, initial conditions.

## Introduction

The main function of opinion polls is to serve as an instrument for citizens to communicate their stand on political issues to their elected representatives. At the same time polls inform people about what others think about different issues and where the majority lies. Thus, it is plausible that public opinion polls may affect the general public opinion itself as people adapt their behavior and change opinion as a reaction to the opinions of others, potentially causing a self-fulfilling prophecy of public opinion (Rothschild and Malhotra 2014). There is a disconcerting possibility that opinion polls create “spirals of silence”, where fear of isolation leads the minority to become increasingly silent and diminish in numbers over time (Noelle-Neumann 1974). If polls have the potential to initiate such dynamics, they will be counterproductive to the ideals of democratic deliberation, which presuppose public discourse among free and equal individuals where political positions must be justified by arguments, and not peer pressure (Elster 1998).

This study tests the *spiral* in the spiral of silence theory within the domain of public opinion polls. Of course, the spiral of silence theory has been tested many times and is central to our understanding of how attitudes are shaped by the social context. However, the *dynamic* nature of the theory (Matthes 2015) and its applicability to opinion polls remain understudied. We construct a survey experimental design that makes it possible to track the influence of an initial poll distribution across several subsequent poll iterations through the innovation of a *dynamic response feedback* algorithm. This automated process divides respondents in one survey wave into several groups, where each group is exposed to the distribution of opinion from the previous group at the same time as they are asked about their own opinion on the issue. If polls actually trigger self-fulfilling prophecies with growing gaps between the

minority and the majority, this will be captured by our design. The algorithm has been applied in experiments on attitudes towards accepting more Syrian refugees into the country, and attitudes towards introducing mandatory measles vaccination for all children. The survey experiments are part of the fourth and fifth waves of the Norwegian Citizen Panel (NCP) conducted in 2015. The NCP is a probability-based online survey panel established for academic purposes, where the participants are recruited via random sampling from the official national population registry.

The results from the dynamic response feedback experiments show that when the respondents are exposed to polls, they do in fact on average correct their perceptions about where the public opinion lies on the issue. Some respondents accordingly adjust their own responses in the direction of the majority. However, the aggregate level impact is negligible, providing little ground for worrying about polls being disruptive for public debate and deliberative processes. Quite the contrary: Using quantitative text analysis, we find that those exposed to a poll provide longer answers and different justifications than the respondents in the control group.

The results indicate that exposure to poll information is immaterial at the aggregate level but has an impact on the internal deliberative process which makes respondents spend more time reflecting about the issue and then taking a stand.

## **Individual-Level Mechanisms of Poll Influence on Opinions**

Diana Mutz (1998) considers three mechanisms that may account for poll influence on citizens' attitudes.<sup>1</sup> The first refers to the wish to be part of the winning team, popularly known as *the bandwagon effect*. The bandwagon effect originates from electoral studies, and refers to voters who decide to vote for the expected winner (Lazarsfeld, Berelson, and Gaudet 1944, Morton et al. 2015). Some electoral studies do observe a bandwagon effect (McAllister and Studlar 1991, Ansolabehere and Iyengar 1994, van der Meer, Hakhverdian, and Aaldering 2015), while others do not, or only for certain groups of people (Tuchman and Coffin 1971, Dizney and Roskens 1962, Navazio 1977). The concept has later travelled beyond the electoral context. It now generally refers to the situation where a person acquires and/or expresses a preference that is in accordance with the preference of the majority because it is intrinsically gratifying to be on the winning side. It has been argued that individuals suppress their opinion on issues because they perceive themselves to be in minority and fear social sanctions as a consequence of being on the losing side (Noelle-Neumann 1974, Kuran 1997).

The second mechanism, *consensus heuristics*, regards the majority opinion as an informational cue to the individual about what is regarded to be the "correct" view. Faced with uncertainty and limited information about the issue, people use the majority opinion as a cognitive shortcut when making up their own mind. In certain circumstances it can be rational for an individual to adhere to the majority position, acknowledging that others in general are more knowledgeable than they are themselves.

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<sup>1</sup> Mutz analyzes a fourth mechanism, which is strategic influence. Also known as tactical voting, this mechanism is relevant only to electoral contexts and thus outside the scope of this paper.

Third, *the cognitive response mechanism* refers to how individuals rehearse the reasoning of others' views, inducing attitudinal change by priming these thoughts. Cognitive response theory suggests that when people are exposed to the opinion of others – whether it may be opinions about an electoral candidate, a political party, or a political issue – they are led to think about the reasons and arguments for holding such opinions. When rehearsing the arguments, people are more likely to familiarize themselves with it and subsequently adopt it themselves. The cognitive response mechanism does not predict movement only in the direction of the majority, as it recognizes that opinion cueing may induce heterogeneous reasoning. Some rehearse the argument of the majority and are nudged in that direction, while others – those who tend to hold the strongest prior opinions on the issue – may develop counter arguments defending his or her initial position (Mutz 1998, 213, Moy and Rinke 2012).

The bandwagon effect, consensus heuristics, and the cognitive response mechanism are three mechanisms that may account for influence from population-based opinion polls (Mutz 1998). If exposure to polls is actually affecting public opinion in the direction of the majority, it may be through one or more of these mechanisms.

### **Aggregate-Level Effects and The Spiral of Silence**

Poll effects – and in particular the bandwagon effect – have been debated for decades (Hardmeier 2008). There are relatively few studies on the influence of polls in a non-election setting. Those that exist demonstrate contradictory results (e.g. (Ragozzino and Hartman 2014, Sonck and Loosveldt 2010, Nadeau, Cloutier, and Guay 1993, Marsh 1985). Recent experiments presenting respondents to fake opinion polls showing varying levels of support

for different political issues found that respondents did react to the treatment and moved in the direction of the perceived majority in some – though not all – of the issues (Rothschild and Malhotra 2014). Although the type of issue and the strength of the treatment mattered for the effect of the polls, the results provided evidence of the fact that poll influence on political attitudes occur in certain circumstances.

In a worst case scenario, the opinion polls can in their own virtue make a permanent impact on the public opinion. The spiral of silence hypothesis claims that citizens who perceive their attitudes to be in minority refrain from expressing their view publicly out of fear of social isolation, and that the dominant majority therefore will become more dominant and louder over time while the losing minority will become increasingly silent in this process (Noelle-Neumann 1974, Moy and Scheufele 2000, Matthes 2015, Noelle-Neumann 1993). One common way to learn what others think is through opinion polls, but to our knowledge, it has not been experimentally tested whether polls can ignite such a spiral of silence that cause escalating gaps between majorities and minorities over time. How much does an initial poll influence subsequent public opinion distributions? Is this initial condition able to set off the public opinion on a dynamic path that would not have occurred otherwise? This is what the hypothesis of the spiral of silence predicts, and we have created an experimental design that is able to test these specific questions empirically within the domain of opinion polls.<sup>2</sup> If the spiral of silence hypothesis is true, we should expect: a) an initial difference in attitudes

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<sup>2</sup> The experimental design is inspired by Jacobs and Campbell's (1961) successive iteration experiment where they measured whether initial misleading information by a confederate would influence not only the responses of the subject that was directly exposed to it but also indirectly affect the responses of subsequent subjects. When a confederate first expressed his/her untruthful opinion, some subjects would feel the social pressure to conform and modify their estimates in the direction of the confederate and alter their responses. Their responses would again affect the following responses of the next subject, etc. Yet after a few such iterations, the trace of the confederate's misleading information had evaporated.

between our treatment and control group on the aggregate level, and b) that this initial difference is increasing over time. When the respondents for instance see a poll that shows higher support for an issue than there really is, even more respondents support the issue, creating an even more skewed distribution which then is presented to the next group of respondents, and so on.

## **Setting The Scene: Experimental Design and The Dynamic Response Feedback**

### **Algorithm**

The experimental design is as follows: Within a survey wave of several thousand respondents, 425 respondents are randomly distributed into one control group and one treatment group. In the control group the respondents are asked their opinion about their attitudes toward a specific political issue. The treatment group is asked the same question but with the addition of being presented with the results from an earlier poll showing a pie chart with the share of respondents who disagree and agree on the question issue. This first pie chart serves as the initial treatment condition. The initial treatment condition is generated from the first 10-15 responses in the survey. Hence, it is a real poll, but one that statistically is more likely to deviate from the population mean than a poll with several hundred respondents. In this way we amplify the likelihood of observing a poll outlier, creating a situation that is less frequent yet not uncommon in the real world.

When all respondents in the treatment group have answered, their responses are processed and the responses then replace the initial poll, serving as treatment condition for the treatment

group at time  $t_2$ . 425 new respondents are then randomly assigned to a treatment or control group at time  $t_2$ .<sup>3</sup> The treatment group is asked the same question but with the addition of being presented with the results from the poll at time  $t_1$  showing a pie chart with the share of respondents who disagree and agree on the question issue. When all respondents in the second treatment group have answered, their responses are processed and then replace the previous poll, serving as treatment condition for the treatment group at time  $t_3$ . The procedure continues until the field period of the survey wave is ended.<sup>4</sup> Automated in the web survey through a script, we label this procedure the *dynamic response feedback* algorithm.

The dynamic response feedback algorithm fetches previous answers given by respondents who have already completed the survey, and presents in real-time the current distribution to the respondent who is about to answer the question. For every  $i$ -th response, the distribution of support for the issue is re-calculated, thus creating several “mini-polls” within the same survey wave. For each new treatment group there is a complementary control group, ensuring that the only thing that varies between the treatment and control group is the poll information, and not for example external events that distort the level of support for the issue in question. In this way, we are able to investigate whether the effect of the initial treatment conditions vanishes or continues to have an impact on the aggregate distribution over several iterations.

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<sup>3</sup> While 425 respondents are assigned to a treatment or control group, not all may answer. Typically, between zero to five respondents are assigned to a group without participating. Hence the attrition rate is negligible at less than 1 per cent. The number of iterations depends on the number of survey respondents that take the survey: When 425 respondents have been assigned to a treatment or control group at time  $t_k$ , a new group is assigned to a treatment or control group at time  $t_{k+1}$ . The last iteration group therefore consists of less than 425 respondents.

<sup>4</sup> The responses do not accumulate, so the treatment group at time  $t$  is only shown the response distribution of the previous group at time  $t-1$ .

## **Issues and questions**

The first question concerned mandatory measles vaccination of children. During the field period (March 9 to March 30, 2015), this issue had been subject to attention in media and public debate. From the media coverage it could be inferred that quite a substantial share of citizens was opting out from vaccinating their children, and one way of maintaining the high vaccination rate in society would be to make it mandatory (as was later proposed by the main opposition party, the Labour party). The respondents in our experiment were asked to answer the following question, using a seven-point scale ranging from strongly agree to strongly disagree: “The vaccination of children has been heavily debated by the media recently. Some people think that it should be mandatory for all children to have measles vaccinations. To what extent do you agree or disagree with this?”

The second question asked about accommodation of Syrian refugees in Norway. During the summer of 2015, the parliamentary majority had decided to accommodate 8,000 extra refugees over the next three years. This sparked a heated debate. The question was fielded in the period October 28 to November 16, 2015, at a time when the refugee crisis dominated the news. Using the same response scale respondents were asked “To what extent do you agree or disagree that Norway should accept more Syrian refugees over the next three years than has been decided?” These two concrete issues were relatively fresh to the public at the time. Hence, they arguably serve as “most likely” cases in which people would be influenced by what others think about the issues since there are fewer available social cues about others opinion on these issues than issues that are more settled.

For each experiment, both the treatment groups and the control groups received four questions about the issue. In addition to the main question about how much they agree or disagree with the statement, the respondents were asked about the strength of their opinion on the issue, how much knowledge they feel they have, and how they perceive the public opinion to be on the issue.<sup>5</sup> The purpose with including these survey items is an attempt to elaborate the causal mechanism at the individual level. As mentioned, the spiral of silence is an aggregate phenomenon which we try to capture by experimental between group comparisons. Although, even if we are able to discern an escalating gap between majority and minority opinions on the both issues, we will not be able to specify in detail which mechanism is at hand and causing this relationship. By conducting an analysis of mediation on the individual level between the treatment effect, the strength/knowledge/perception of others issues on the outcome variable, we will come one step closer in determining whether the observed gap is caused by the consensus heuristics or a bandwagon effect. If the treatment effect is stronger for a respondent who a) does not have a strong opinion; b) does not perceive him- herself to be knowledgeable on the issue at hand, and; c) believes that a majority of others agree, this lends support for that it mainly is the consensus heuristic mechanism that is at hand. If the mediating effect goes in the other direction, i.e. that the treatment effect is stronger among respondents with high self-perceived knowledge and strong opinions, this could indicate the presence of the bandwagon mechanism.

When it comes to cognitive response, the effect of opinion polls does not necessarily go in the direction of the majority. Polls may trigger a cognitive response where individuals spend

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<sup>5</sup> The three follow-up questions were posed to the respondents in all three experiments, with a five-point unipolar answer scale: 1. "How strong are your views about this question?" 2. "How good do you feel that your knowledge about this subject is?" 3. "If you were to guess, how many of Norway's citizens do you think would agree that [main issue statement repeated]."

more time thinking about the issue, reasoning about different arguments, weighting pros and cons in order to take a stand, and not necessarily in line with the majority. In order to investigate the cognitive response mechanism, we thus add another dimension to the experimental design. The Syrian refugee experiment is accompanied by an open-ended follow-up question where the respondents were asked to motivate their answer to the question about allowing more Syrian refugees into the country. In this way we are in a position to investigate if exposure to a poll triggers something similar to the cognitive response mechanism discussed above. If we are not able to observe any effects reminiscent of the spiral of silence, it could still be the case that polls have an effect on public opinion by generating cognitive processes that affect respondents' reasoning about the refugee crisis in general and the country's role in providing asylum to refugees in particular.

## **Data**

We implemented the experiments in waves four and five of the *Norwegian Citizen Panel* (NCP) conducted in 2015 (Ivarsflaten et al. 2015a; 2015 b). The NCP is a probability-based research-purpose online survey panel administered by the Digital Social Science Core Facility (DIGSSCORE) at the University of Bergen. An important advantage of the NCP is the amount of background information available about the respondents. It has a non-deception policy, which means that we could not present a fake poll to the respondents in the first treatment group. Hence, in order to have a poll result to show these respondents, we collected answers from the first 10-15 respondents, which made up the initial treatment condition. A total of 4,582 respondents participated in at least one of the experiments, with 3,759 respondents participating in one experiment and 823 participating in two. For more details about response rates or other methodological issues we refer to the NCP methodology reports

(Skjervheim and Høgestøl 2015b, a). The data is freely available for scholars via the Norwegian Social Science Data Archive.

## **Methods**

The respondents are either treated (by being shown a poll) or not. We are interested in the expected difference in answer between the two, which is the average treatment effect (ATE). We want to identify the ATE for each post treatment measure in each iteration. We use a linear regression to estimate the ATE. The estimates are shown in Figures 2 and 3. They show the expected difference in answer between the respondents that received a poll (in that iteration) and the respondents that did not.

We also want to see whether or not the effect is being mediated via respondents' stated strength of opinion, knowledge of issue, or perception of others' attitudes. We therefore conduct an Average Causal Mediation Analysis (see Imai et al. 2011), which can estimate this but assumes that there are no confounding pre- or post-treatment variables that might affect either their main answer or the mediator. With these assumptions, however, we are able to identify the Average Causal Mediation Effect (ACME) of being shown a poll. The ACME can be thought of as the difference in outcome that is due to changes in the mediator (say, the respondents' stated strength of opinion) while holding the treatment constant. To estimate the ACME we fit one linear model with the mediator as outcome and treatment as predictor and one linear model with the respondent's main answer as outcome and both mediator and treatment as predictors. We then use these models to predict the respondent's main answer when shown a poll and when not shown a poll for different levels of (say) stated strength of

opinion. We do not estimate the AMCE for each poll (i.e., iteration), but rather for all polls combined. The ACME, then, is the expected average difference in the respondents' main answer when changing their stated strength of opinion while holding the treatment constant. That estimation is done using quasi-Bayesian Monte Carlo method with 1000 simulations. The estimated ACME is displayed graphically in Figure 3. We did the analyses using the R programming environment with the mediation (Tingley et al. 2014), and stm (Roberts, Stewart, and Tingley 2014) packages. <sup>6</sup>

### **Structural topic modelling of open-ended responses**

As mentioned above, a randomly assigned half of the respondents that received the question about accepting more Syrian refugees were given an open-ended follow-up question where they were asked to justify their answer. We use an unsupervised topic modelling method called Structural Topic Models (STM) to extract quantities of interest from the open-ended answers (Roberts et al. 2014). Topic models are machine learning methods that use the patterns of word co-occurrences to infer topics in texts. They allow for inductive searches for semantic themes in text corpus without relying on human coding of answers. STM is a distinct method that has the ability to also incorporate metadata in the estimation. Thus, we are able to leverage the existing data we have about the respondents in the Norwegian Citizen Panel. It is a logistic-normal mixed membership topic model where each answer gets a mixture of topics. The main quantity of interest we extract from a chosen model is the prevalence of each topic within each answer. We then use Topic prevalence can then be used

as post treatment measure. We use treatment assignment, gender, age, education, and political interest as priors when we estimated the models. In addition, we extract the length of the answers in terms of number of words. We then use answer length and estimated topic prevalence as a post-treatment measure and estimate the treatment effect using the same methods outlined earlier. This allows us to see whether and to what extent being shown a poll affects how much the respondents write and what topics they write about when justifying their answer.

We decided on our first run with five topics (“5.1”), justified with extensive qualitative assessment done by all four authors by first individually reading each of the 809 answers as well as the results from 4 runs of models with 3 to 12 topics (a total of 36 runs) and then collectively agreeing on the best run.<sup>7</sup> We all agreed that the 5.1 run best corresponds the wide range of topics identified in the manual readings while also having good semantic coherence within and exclusivity between topics. The label, description, and most important words of each topic in the 5.1 run are displayed in Table 1 presented later in the text.

## **Results**

In the following, we present the most relevant results from the survey experiments. All results are available from the authors by request. The experimental procedure of the Syrian refugee issue (a), and the Mandatory vaccine issue (b), respectively, is presented in Figure 1. The  $t_0$  iteration generates the initial treatment condition, which is seen as a pie chart poll for the treated respondents at iteration  $t_1$ . For the Syrian refugee issue, this initial treatment condition

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<sup>7</sup> See the supplementary material for an overview of all model runs.

shows a poll where 40 per cent of the respondents agree with the question statement. The corresponding poll for the vaccine issue is 93 per cent. The circled numbers represent the proportion of the respondents that agree with the question statement at each iteration. The dotted arrows indicate how the responses at iteration  $t_k$  in turn are displayed as opinion polls to the following respondents at iteration  $t_{k+1}$ . For example, for the Syrian refugee issue, the proportion that agree to allow more Syrian refugees into the country is 52 per cent at iteration  $t_1$ . The treated respondents at iteration  $t_2$  hence see a poll where 52 per cent agree on the statement. The treated respondents at iteration  $t_3$  see a poll where 61 per cent agree, and so on. The control group respondents receive no information about previous answers. The two bottom rows in Figure 1 show the cumulative number of respondents taking part in the experiments.

Figure 1: The dynamic response feedback design implemented on the issues of Syrian refugees and mandatory vaccination issues.

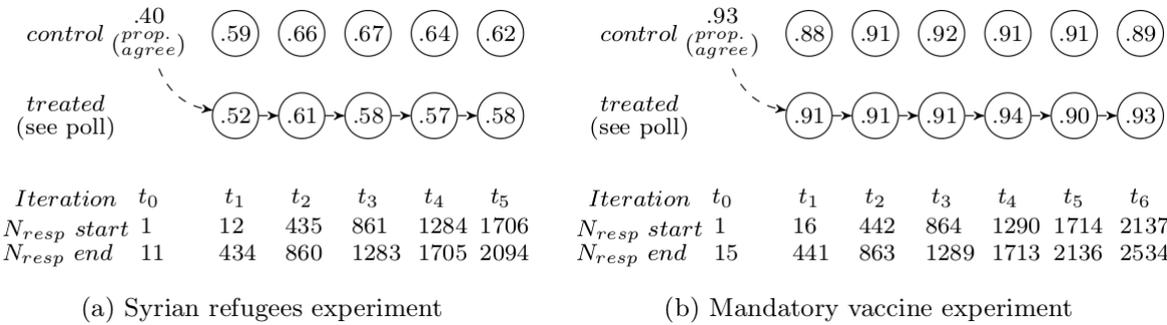
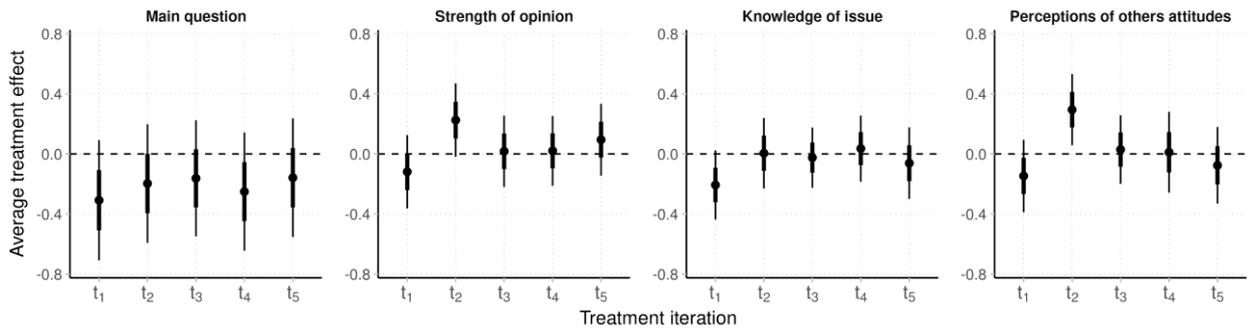


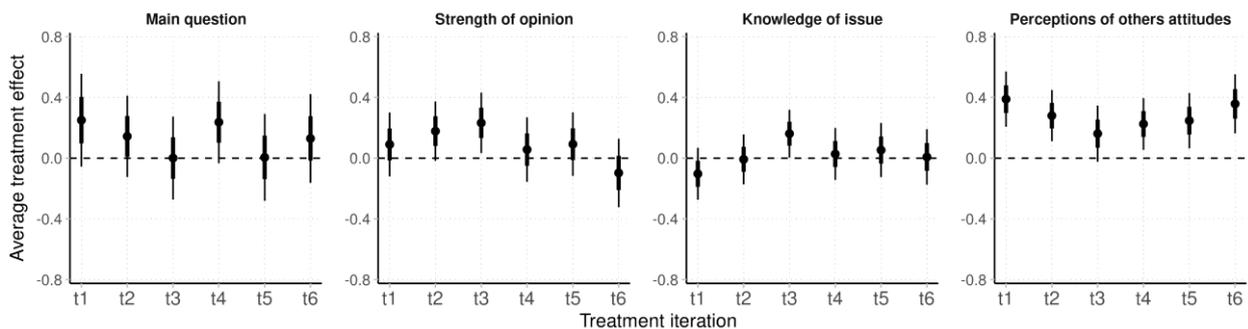
Figure 2 summarizes the average treatment effects on the treated for each of the post treatment measures for the Syrian refugee experiment. The figure shows the (expected) difference in answer between those that are exposed to a poll and those that are not (the vertical axis) for each treatment iteration (the horizontal axis). The dotted line is the expected answer of the control group at the corresponding iteration.

Figure 2: Average treatment effects over time between treatment and control groups for the Syrian refugee issue.



In Figure 2, the Main question refers to the acceptance of Syrian refugees. We observe that the respondents in iteration  $t_1$  are less supportive of accepting refugees than the control group respondents, but not significantly different. The  $t_1$  group saw a poll with 40 per cent agreeing on accepting Syrian refugees, which is clearly lower than the true distribution, and they adjust their own attitudes as well as their perceptions of others' attitudes accordingly. In the presence of a spiraling effect, it will manifest itself in Figure 2 as an increasing distance over time between the control group on the dotted line and the treated group. Yet, even if the initial poll was much different from the true opinion distribution, the aggregate distributions between the control groups and treatment groups are indistinguishable.

Figure 3: Average treatment effects over time between treatment and control groups for the mandatory vaccination issue.



For the vaccine issue, the initial poll that the respondents in the first iteration were exposed to showed 92.9 percent agreeing to make measles vaccination mandatory for children. After becoming exposed to information that the vast majority agrees on mandatory vaccination, Figure 3 shows that the respondents agree more strongly than those who do not see it. All six iterations show that the treatment groups have a higher mean score on the main question than the control groups do. They increase from an already high level; in the control group, the mean response is 5.9 on a scale from 1 to 7. There is however no sign of a spiraling effect which predicts an escalating gap between the control group and treatment group over time: The treatment effect remains positive but stable at around 0.1 points and not statistically significant from the control groups.

For the measles vaccine issue, the respondents clearly shift their perceptions about what others think about the issue. This serves as a manipulation check, confirming that the treated respondents view the distribution as a signal of the true public opinion. For the Syrian refugee issue, the respondents who are exposed to the poll do not significantly differ from the control group in this regards, possibly because the control group's perception is close to the distribution that the treated respondents are presented with.

In sum, the experiments using the dynamic response feedback algorithm show negligible poll effects at the aggregate level.<sup>8</sup> It is evident that the polls in our experiments are not able to create information cascades where the public opinion increasingly diverges from the “true” public opinion. There is thus little reason to fear that polls in and of themselves disrupt the

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<sup>8</sup> A third experiment that is conducted in similar fashion reveals similar results. The results from this third experiment will be made available upon request.

public deliberative process and become self-fulfilling prophecies in their own virtue. That said, being exposed to the polls does cause reactions among the respondents that take other shapes.

**Individual-level mechanisms**

While public opinion is overall little affected by being exposed to information about the majority opinion, the causal mediation analysis is somewhat more supportive of individual level effects. Figures 4 and 5 show the average causal mediation effect (ACME) of opinion strength as mediator, knowledge of issue as mediator, and the respondents’ perceptions of the attitudes of others as mediator on the Syrian refugee and the vaccine experiments respectively.

*Figure 4: Average causal mediation effect for showing a poll about what other people think about refugees coming to Norway.*

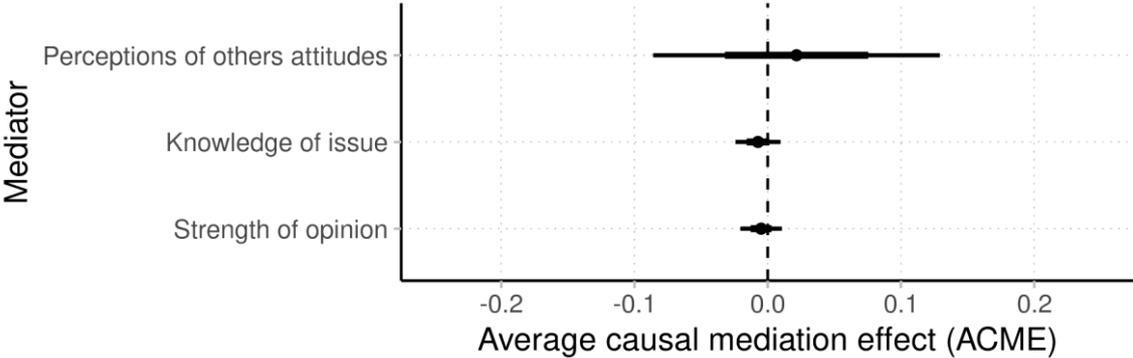
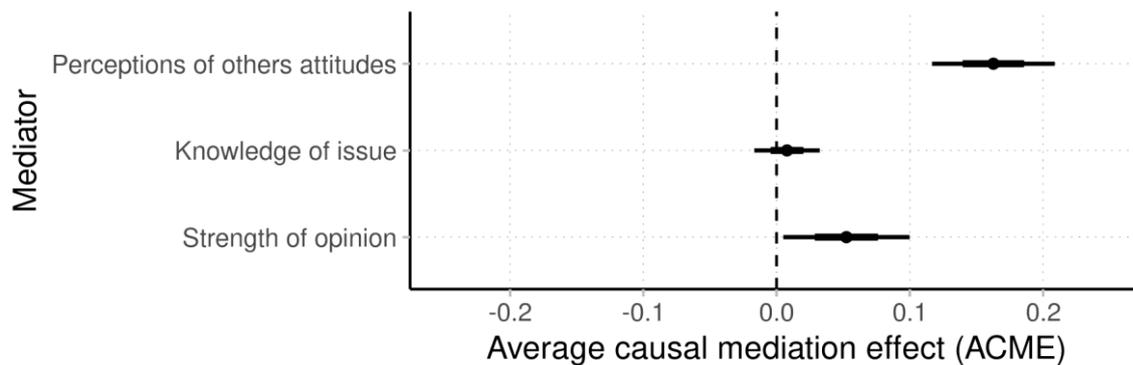


Figure 5: Average causal mediation effect for showing a poll about what other people think about mandatory vaccination.



Here we observe that there is a significant positive mediating effect of the latter variable on the vaccine issue. In other words, this shows that those who see the polls on vaccination on average adjust their perceptions of others' opinion, which in turn changes their own attitudes on the issue. And, they change them in the same direction as their perceptions about the public opinion, which is an indication of a bandwagon effect.

Interestingly, there is also a large drop in the share of respondents who tick off the middle option on the answer scale (i.e. 4 = "neither agree nor disagree"). On both issue between, between 25 and 29 percent fewer of the treated respondents reply that they neither agree nor disagree. Taken together, these results indicate that seeing a poll about the opinion of others makes the exposed respondents more opinionated and more likely to also take a stand themselves. As we shall see in the following section, they also think *differently* about the issue than those in the control group.

The topic analysis shows that the answers the respondents give when explaining their attitudes towards accepting more Syrian refugees largely can be separated into five topics. Table 1 shows how the explanations are categorized for all respondents jointly.

*Table 1: How the respondents replied when asked to explain their view on refugees coming to Norway. Topics generated by using structural topic modelling.*

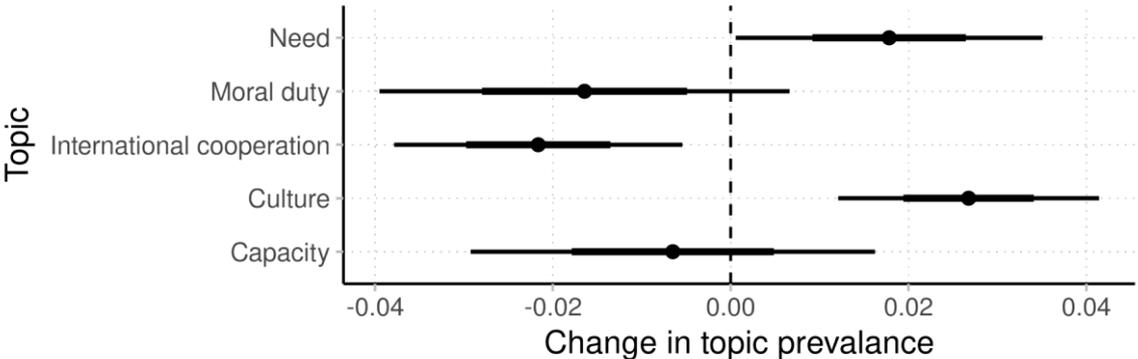
<i>Topic</i>	<i>Typical response</i>
<u>Capacity</u> Regards the economic or physical capacity to take in more refugees.	“In order to receive more Syrian refugees, we need to make sure the economy and capacity is in place so that it is handled in a satisfactory way.”
<u>Moral duty</u> Expressions of a moral obligation to help people that flees from war.	“Many people are in crisis, it is a state of emergency, and we need to stretch further than we normally would have done. We are extremely lucky to live in this country, and it is our duty to share and help people in despair.”
<u>Questionable need</u> Doubting the refugee status of the asylum seekers.	“We do not help those who really need it, it is the resourceful who flee. Where are all the women and the children and the elderly? We should help them in their homeland. We cannot save the world.”
<u>International cooperation</u> There is an international effort in dealing with an unexpected situation, and the country must take part in this joint effort.	“Norway must contribute equally much as other rich countries do.”
<u>Culture</u> Regards the differences in culture and the religion between the citizens and the refugees.	“Hard to integrate into society. Partly due to capacity, as well as the willingness from those who arrive and want to maintain their culture and religion.”

The first and most dominant topic is concerned with the country’s economic or physical capacity to take in more refugees. The argument goes that the infrastructure is pushed to its limits, that it will be expensive to provide the refugees with decent living conditions. Others say that if any country has the capacity, it is Norway, one of the richest countries in the world. The second topic expresses the argument that we have a moral duty to help people that flee from war, just like the Norwegian refugees were welcomed by other countries during the Second World War. The third topic questions the need of the asylum seekers that arrive.

Typically, the responses point to that the majority of them do not come from Syria, and that those who come are not those in greatest need of help. The fourth topic is about the international cooperation, and that the country must take part in the joint effort in dealing with an unexpected situation. The final topic concerns culture. Here, the responses point to the differences in culture and religion between the refugees and the citizens in the receiving country, and that this is the reason for their expressed attitudes on the issue. The proportion of the topics is fairly evenly distributed in the responses. The most text is devoted to the capacity topic, while culture is the least prominent topic. Many respondents write long replies, which might suggest that it is an important issue in which they feel a need to explain their views.

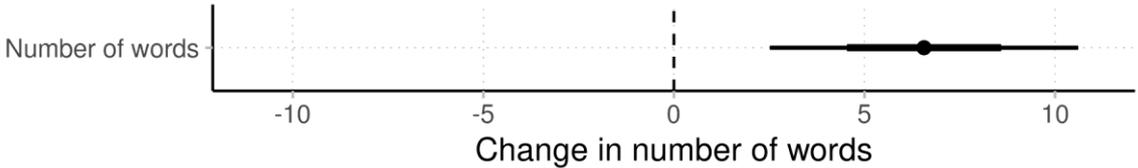
Our interest lies in the difference between the treatment and control groups, and whether being exposed to polls about others' opinions affects the open-ended answers they give. The observed differences may come directly from the poll exposure, or as a mediated effect through the attitudes the treated respondents expressed after observing the polls. Figure 6 shows the average treatment effect on the treated on their expected topic proportion, that is, what topics the respondents write about in their open-ended answers. The X-axis goes from zero to one, so that a 0.01 increase signifies that the proportion of the topic has increased by one percentage point.

Figure 6: The difference between control and treatment groups in topic prevalence in reply to open-ended question about explaining their view on refugees coming to Norway.



Interestingly, the respondents who have been exposed to polls give substantively different answers from those who have not seen a poll. The respondents who have been exposed to a poll write more about need and culture, and less about international cooperation. Figure 7 shows that the respondents who see the poll about other people’s attitudes write longer answers in the open-ended question. This suggests that poll exposure ignites some kind of reaction which is traceable in the open-ended responses. They write more about some issues than others, and they provide longer answers, spending more time thinking about the issue.

Figure 7: The difference between control and treatment groups in length of reply to open-ended question.



The treatment effect of polls on the respondents’ open-ended answers align nicely with the cognitive response mechanism. Cognitive response theories suggest that public opinion cues may induce attitude change by prompting people to mentally rehearse arguments related to the

issue position (Mutz 1992, 98). The measured differences between the treated and control groups indicate that those exposed to a poll have changed and expanded their argumentation, just as one would expect from a person who has given extra thought to an issue. We do not infer from this that the views of the respondents are any *better* than those of the control group, but it does seem that polls make people give the issue more thought and perhaps allow themselves to reconsider their attitudes.

### **Conclusion: The Role of Polls in The Deliberative Process**

In contemporary democracies citizens are continuously exposed to the political opinions of other citizens, often through opinion polls presented in different types of media and carried out by a wide array of political actors such as political parties, think tanks and interest organizations. Polls inform political decision-makers about the citizens' views on political issues, which help them making policies that are responsive to the will of the people. The political consequences of opinion polls have been subject to debate, where both potentially positive and negative effects have been put forth. On the one hand, it could be argued that the frequent use and presentation of opinion polls may lead to increased opportunities for the public to learn about important political issues and public opinion. It has also been argued that polls inform political decision-makers about citizens' views on political issues, which helps making policies that are responsive to the will of the people. On the other hand, there exist concerns about the possibility that opinion polls become self-fulfilling prophecies since polls themselves may drive public opinion.

The spiral of silence theory presupposes that the public opinion is very sensitive and easily affected by other people's opinions. Since the theory states that even a small difference

between two different opinions will be increased over time, dynamics is an integral part of the spiral of silence theory. However, the dynamic dimension is typically set aside in empirical tests of the theory. In the real world, using observational data, it is impossible to isolate opinion polls and their effects on public opinion.

In this paper we therefore present a novel experiment explicitly designed in order to investigate the dynamics of the effect of opinion polls on public opinion. Rather than limiting the study to the one-time effect of these information treatments, we track their potential effect over time by applying the dynamic response feedback algorithm during the survey data collection. This algorithm fetches previous answers given by respondents who have already completed the survey, and presents in real-time the current distribution to the respondent who is about to answer the question.

The results from the series of experiments reported show that there is little reason to worry about negative side effects – such as a spiral of silence – from publishing public opinion polls. People are indeed affected by learning what others think about the issue in question but the effect is not strong enough to have a significant effect on the aggregate public opinion. Quite the contrary, polls seem to spark a cognitive response on behalf of the citizens. They are more likely to form an opinion on the issue in question, and they are more likely to evaluate the arguments in favor and against. According to our results, being exposed to the views of others through polls is a good thing.

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