Can the internet overcome the logic of collective action? A pilot experiment investigating the impact of social pressure on political participation

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Abstract

This paper reports on an experiment which investigated the impact of the internet upon the logic of collective action. Specifically, it examines how political participation may be stimulated by one particular characteristic of the internet – to provide real-time feedback information on the participation of others in a political action. The paper tests the hypothesis that such information makes it possible in large groups to exert the 'social pressure' that Olson (writing in the pre-internet era) considered only viable for smaller groups. Two further competing hypotheses regarding the effect of different levels of support are investigated: first, that such social pressure will be greatest when the number of other participants are large, making people aware of what sociologists have termed a 'critical mass' of support; second, that feedback information about small numbers of other participants will have greatest effect, convincing individuals that their participation will 'make a difference'. The paper uses an experimental design, with 47 laboratory-based subjects, who were invited to sign petitions and donate money. They were randomised into treatment and control groups, who saw the numbers of other people who had signed the petitions, and those who did not. The paper finds a statistically significant difference between these groups. Furthermore, the signing of petitions in the treatment group increased relative to other petitions when the numbers presented were greater than one million. Where the numbers were in the 'middle' range, the treatment group were significantly more likely to donate money to the issue. There was no impact at the lower end of the scale, with numbers less than twelve. The findings lend support to Marwell and Oliver's claims about critical mass and suggest a posthumous revision of Olson's 'logic of collective action' for the internet age.

In *The Logic of Collective Action*, Mancur Olson (1965) put forward a thesis of when individuals can be incentivized to act collectively. He argued that, when organising around collective goods, 'small groups are more efficient and viable than large ones' and that if they are not, they need to be able to coerce their members or provide selective incentives to contributors. Generations of social scientists have worried about the implications of Olson's argument, thinking that it skews the influence of interest groups, limiting the ability of large groups to represent their interests. It would be fair to say that some of the concern has receded about this problem, from more advanced formal work to studies by sociologists that suggest larger groups may actually find it easier to form, as their size makes it more likely they will be able to attain a 'critical mass' of activists who organise around public goods (Marwell and Oliver 1993). Marwell and Oliver argue that the costs of collective action around many public goods vary little with group size, due to 'jointness of supply'; the cost of lobbying for a policy change, for example, is the same regardless of the number of potential contributors. In these cases it is irrelevant to those who contribute how many others are 'out there', so free-riding is unlikely to be problematic: 'When a 'social solution to the collective dilemma is required, what matters is the relationship among the possible contributors in the critical mass, not the relationship among everyone in the interest group' (Marwell and Oliver: 1988:60). So larger groups are just as likely to exhibit collective action as smaller ones, and indeed under some conditions more likely, as they are more likely to be able to assemble a 'critical mass' of activists.

However, the general problem of incentivization that Olson raises – who contributes and to what effect – remains a core issue within political science. In particular, how do individuals use information about what others are doing as a way of making up their decision about whether to participate or not? Rather than participation being a consequence of resources and psychological orientation, it involves an alignment of incentives between the participants. The considerations do not just happen at small numbers, but occur at the higher end (Marwell et al 1985, Oliver and Marwell 1988). Although Marwell and Oliver's argument is persuasive in terms of justifying how large groups form (contrary to Olson's predictions), it is not clear how individuals would calculate the likelihood of a group reaching 'critical mass' or how their incentives would be affected by their perception of such a likelihood, nor do they attempt to put a number on the concept.

One approach is to suggest that the structure of incentives is set for all time, at least in an industrialised and mobile society, where there are large latent groups, and where not all interests are mobilised. But there is another line of argument that suggests that changes in technology affect the logic of participation, partly because they reduce the costs of participating and partly because they alter the information that individuals receive about each other. Many writers have speculated on how widespread use of the internet could affect Olson's thesis and offered refinements to some of his claims (e.g. Bimber 2005). In particular, Lupia and Sin (2003) argue that evolving technologies - particularly the internet - affect opportunities and incentives that are relevant to collective action, advantaging some collective endeavours and endangering others (Lupia and Sin, 2003: 318).

It is with the capacity of the internet to change the information environment within which potential participators operate and thereby change the incentives for potential collaborators that this paper is concerned. The experiment reported in this paper seeks to test how this aspect of the internet in particular may alter the provision of collective goods. Subjects were asked to participate in a laboratory experiment in two ways; first, to sign an e-petition (an area of citizen involvement which has expanded in recent years) and second to donate a small proportion of their turn-up fee to the cause of the petition. The experiment, a pilot study, investigated whether (a) seeing the numbers of other participants (as opposed to not seeing them) influence the willingness to sign and contribute and (b) how the actual number of other people signing influences willingness to contribute and the direction of the influence. The paper reviews the literature on collective action and the internet, then sets out the methods, reports the results and then summarises the implications for research.

Collective action and the internet

Olson discusses collective action and group size by dividing groups into three types. First, in a small privileged group, each member, or at least one of them, has an incentive to see the collective good is provided, even if he has to bear the whole burden of providing it himself. Second, in an intermediate group no single member gets a share of the benefit sufficient to give him an incentive to provide the good himself, but the group does not have so many members that no one member will notice whether any member is or is not helping to provide the collective good. Third, in a large latent group if one member does or does not

help provide the collective good, no other member will be significantly affected and therefore none has any reason to act. Thus an individual in a latent group cannot make a 'noticeable' contribution to any group effort, and since no one in the group will react if he makes no contribution, he has no incentive to contribute. So only a separate and selective incentive will stimulate a rational individual in a latent group to act in a group-oriented way. In passing, we note it is difficult to discern from Olson when he means an individual's behaviour *will* be noticeable to others and when an individual *feels* that it will be noticeable themselves. Lupia and Sin place emphasis on the concept of noticeability, but they also fail to make this distinction.

Olson discusses the effect of social pressure to incentivize group members to participate, but discards it for larger groups; 'In general social pressure and social incentives operate only in groups of smaller size, in groups so small that the members can have face-to-face contact with one another' (62). But Lupia and Sin point to a footnote: 'If the members of a latent group are somehow continuously bombarded with propaganda about the worthiness of the attempt to satisfy the common interest in question, they may perhaps in time develop social pressures not entirely unlike those that can be generated in a face-to face group, and these social pressures may help the latent group to obtain the collective good. *A group cannot finance such propaganda unless it is already organized* and it may not be able to organize until it has already been subjected to the propaganda; so this form of social pressure is probably not ordinarily sufficient by itself to enable a group to achieve its collective goals. Lupia and Sin point out that communication technologies, such as the internet, could revise the ability of large groups to apply such social pressure.

There have been few attempts to provide empirical evidence to substantiate these claims. There are a number of excellent reviews of the possibilities for the internet to facilitate collaboration and reduce collective action problems, notably Lev-On and Hardin (2007), Bimber (2003) and Lupia and Sin (2003), but they are almost wholly qualitative. In particular, although experiments have been widely used in economics to investigate collective action and in political science to suggest how individuals behave in collective choice situations (for example, Dawes, 1986) and how to design institutional rules to maximise co-operation in commons-based decision making (Ostrom, 1997), there have been few experiments to simulate the type of environments in which individuals decide whether to contribute participatory costs to supporting mobilisation around public goods. Gerber,

Green and Larimer (2008) used a large-scale field experiment to investigate the effect of social pressure on voter turnout, but in this case social pressure was applied through the effect of voters feeling that their own lack of participation would be observable to their household or neighbours, rather than being influenced by information about what their household, neighbours or wider community were doing themselves. In particular, there have been very few experiments exploring what effect the internet might have on such an environment.

Purpose

The purpose of this experiment is to test empirically how certain aspects of the internet affect collective action decisions. Specifically, we want to examine the effect of the capability of internet-based applications to provide users with real-time information about other people's preferences. Does such information result in the type of 'social pressure' referred to by Olson? And is such social pressure maximised when numbers are small (so that an individual feels their action to be more noticeable) or large (so that an individual feels more 'bombarded' with social pressure and other social incentives?)

Hypothesis

Our hypothesis is that information about the preferences of others will affect people's decision whether to incur costs in the pursuit of collective action. That is, if people know (for example) how many people have signed a petition, we hypothesise that it will affect their willingness to sign or to incur other costs in the pursuit of the issue that is being petitioned for. There are two competing hypotheses:

- First, that large number of other petitioners will encourage individuals to incur costs and sign up. Evidence of others' behaviour will provide the 'social pressure' referred to by Olson and the likelihood of 'critical mass' predicted by Marwell and Oliver.
- Second, that small number of petitioners will encourage individuals to incur costs, because they perceive that their contribution is more likely to make a difference. As well as reducing organizational costs of mobilization (something we follow Lupia in taking as a given) and reducing the costs of participation for individuals, the actions of any one or more members in a group are more 'noticeable' in Olson's terms, either to any other individuals to a group or to the potential participant themselves.

Experiment: Overview and Methods

The experiment tested these hypotheses by exploring the effect of information about the mobilisation of others on any one individual subject's willingness to incur costs in supporting a collective issue. Around 40 people were invited to participate from OxLab's pool of subjects (which includes both students and non-students from the city of Oxford). Both groups were provided with a list of six petitions currently active and asked first, whether they agreed with the issues being petitioned for, second to spend ten minutes finding out about the issue on whatever web sites they chose and third, whether they (a) would sign the petition on the issue (or against the petition if they wouldn't) and (b) whether they would give a small proportion of their participation fee towards supporting the issue. They were divided into two treatments: one received information about how many people had signed the petition (some of the petitions had high numbers of signatures, some low) and the others received no such information. The No.10 Downing street web site was blocked during the experiment, to prevent those in the second treatment finding this information.

Experiment: Set-up

Participants were asked to consider six petitions, based on the following issues:

1. To introduce a tax on plastic carrier bags
2. To exert pressure on the Japanese government to halt its programme of whaling
3. To create a new public holiday, the National Day of Remembrance
4. To provide free prescriptions for asthma sufferers, unrelated to income
5. To employ a policy of an opt out system instead of the current opt in system for organ donation
6. To scrap the introduction of compulsory identity cards

After completing a pre-experiment questionnaire in which they were asked to state their level of agreement with each issue, they were told:

> *'On the following screen, you will see "policy changes" that citizens have proposed in the form of a 'petition' to the government. They are related to the issues you were asked to consider in the questionnaire you have just completed. Some of them have been signed by thousands of people, others by very few. We would like you to consider what you*

think about the issue for ten minutes. You can visit any web sites that you like. Then we will ask you to consider if you would be willing to do the following:

(1) Would you be willing to sign the petition?

(2) You will receive £12 for participating in this experiment. You have another £3 of which you may donate all, some or none to supporting these petitions. For each 50p you donate, we will donate £2 to supporting the issue you specify. If you donate nothing, you will receive the £3'.

After carrying out these tasks, subjects were asked to complete a post-experiment questionnaire.

Subjects were divided into a control group and a treatment group by allocating them in turn to the treatment and control group as they entered the lab:

Treatment Group: Feedback Information – subjects were told from the first point at which they were presented with the petition how many other people had already signed. The numbers were:

Petition No.	Issue	No. of signatories provided to treatment group
1	tax on plastic carrier bags)	665,768
2	halt Japanese programme of whaling	9
3	new public holiday on Remembrance Day	369,492
4	free prescriptions for asthma sufferers	11
5	opt out system for organ donation	1,234,117
6	scrap introduction of compulsory identity cards	6

Control Group – subjects were provided with no information about how many other people had signed the petition and the No. 10 Downing Street Web site (which provides such information) was blocked during the experiment for both treatment groups.

We conducted three sessions over three days at OxLab[1] in Oxford: the sample were drawn from OxLab's subject database and consisted of both students and internet users drawn from the general population of Oxford that were not studying. Forty-seven people participated in the experiment, twenty-four in the control group, twenty-three in the treatment group, which received the information.

The experiment was realised with a Internet browser-based interface. Once in the lab and after a short briefing, subjects would log-on to our website using a unique ID. A

[1] We are grateful to the Fell fund of the University of Oxford that supported the setup of an experimental computer lab in Oxford, which we used to conduct our experiments (see http://oxlab.oii.ox.ac.uk).

custom-build Perl script would then handle the interaction, guiding subjects through the different stages of the experiment (instructions, pre-questionnaire, petitions, post-questionnaire), saving their answers and all the way also keeping a record of their action so subjects could come back to where they left of, for example in case they had accidentally closed their browser. The subjects used PCs with the Firefox browser (version 1.5 and 2.0) with the Slogger extension[2] in order to log times and the URLs of pages that were accessed through the browser.

Results

As there were six petitions, we stacked the data so as to examine the variation according to the numbers the petitioners could see signing, which yielded a total of 282 person-petitioners. The following table yields the result of the experiment for signing.

Table 1: Signing the petitions

	No information	Information	Total
Not sign	66 46%	50 36%	116 41%
Sign	78 54%	88 64%	166 58%
Total	144	138	282

Estimated Treatment Effect	9.6
Standard Error of Estimated Treatment Effect	5.8
95% Confidence Interval for Estimated Treatment Effect	-1.84-21.05
1-tailed Significance of Estimated Treatment Effect	.05
Statistical Power of this Experiment	50

As the table indicates, there was a greater willingness to sign the petition when the individuals had information, which had a treatment effect of 9.6. This effect is statistically significant at the .05 level with a one-tailed test - getting the information does matter. The experiment has a respectable power at 50 per cent.

Clearly, we would expect the likelihood of an individual signing to also be affected by the extent to which they agreed with the issue under consideration. So we also ran a probit regression using both the treatment and a variable based on responses to the pre-

[2] To this effect we used Slogger, a Firefox Addon by Ken Schutte. See https://addons.mozilla.org/en-US/firefox/addon/143 [01.07.2008]

experiment questionnaire, where subjects were asked whether they agreed or disagreed with the issue of the petition, which we label 'support for issue' . As Table 2 shows, the treatment is significant at p=.1 (a two tailed test), a probability of 0.098, while 'support for issue' is significant at the .05 level. It could be argued that a two-tailed test is applicable in this case because theory says that knowing the numbers could increase or decrease participation.

Table 2: Probit model of signing petition and support for issue.
(standard errors in parentheses)

Treatment	0.259 (0.157)+
Support for Issue	0.486 (0.093)*
Constant	-0.904 (0.184)*
Number of obs	280
Log likelihood	-174.47661

+=p. <.1 *p. <.05

The second outcome variable was whether subjects donated money to the issue, which is reported in the same way. This part of the experiment showed no statistically significant difference between the groups, although the table shows that slightly fewer people donated money in the treatment group than in the control group.

Table 3: Donating money

	No information	Information	Total
Not donate	102	106	208
Donate	42	32	74
Total	144	138	282

Estimated Treatment Effect	-.60
Standard Error of Estimated Treatment Effect	5.2
95% Confidence Interval for Estimated Treatment Effect	-.16- 4.3
1-tailed Significance of Estimated Treatment Effect	.87

Statistical Power of this Experiment	.3

The preliminary analysis, therefore, has established an effect for the treatment on people's likelihood of signing, although not for donating money. These results are encouraging; clearly, the small sample size – particularly for donating money, which far fewer subjects did than signing a petition – works against dramatic results for this part of the experiment.

To test our hypotheses, we wanted also to investigate the effect of the size of numbers of other participants that were presented to the treatment group. Recall that we set out the idea that the impact of the treatment should vary according the numbers that people think are signing. Each petition with which citizens were presented had a different number: 6, 9, 11, 369,492, 665,768, and 1,234,117 (see the list of petitions above). It may be the case that high numbers encourage individuals to participate as one of our hypotheses predicted, but low numbers discourage them. To test the idea that it is the size of petition that counts, we created three interaction terms with treatment – 'low' for cases with 6, 9 and 11 other signatories and 'high' for 1,234,117. For the other two cases, we created a 'middle' interaction term.

We tested this with a probit regression reported in Table 4. Again, we included in our model a variable to reflect the extent to which subjects agreed or disagreed with the issue of the petition.

Table 4: Probit model of signing by numbers on the petition – high model
(Standard errors in parentheses)

Feedback: agreeing with issue	.496 (.094)
High numbers	.880* (.340)
Constant	-.496 (.150)
Log likelihood	-172.06
N	282

+= p. < .1 * p. <.05

These results are encouraging. At the high end we see support for the argument that respondents see a large petition and this encourages them to sign. When we ran the same model with the 'low' and 'middle' variables, there is no significant effect.

When we apply the same treatment to the numbers of subjects donating money, there is again a finding, shown in Table 5 below. As noted above, there was no significant treatment across the two groups for donation, and we also found no significance for the petition with the 'high' number of people signing. However, when we applied the 'middle' interaction term to a probit regression, we obtained significance to the 10 per cent level. For donating money, it seemed that low numbers and high numbers have a neutral effect, but middle numbers of between 300,000 and 600,000, have a negative effect. It may be that these numbers are high enough for an individual to feel that it will make no difference whether they participate or not, but not high enough to seem as if critical mass has been reached or to exert the kind of social pressure that higher numbers suggest – so overall, the individual sees no benefit in donating when they are given these numbers.

Table 5. Probit model of donating money by numbers on the petition – middle model (standard errors in parentheses)

Feedback: agreeing with issue	.226 (.103)*
Middle numbers	-0.493 (0.252)+
Constant	-.882 (.176)
Log likelihood	-156.356
N	282

+= p. < .1 *= p. <.05

Further Research

The findings we have reported are modest and reflect the pilot nature of the study and its small sample. A more robust test of the impact of high or low numbers would need treatment groups that vary the numbers and control for the type of petition. Given that it appears that different categories of numbers are likely to have different (and in some cases opposite) effects, we really need to test them on a far larger base, with a rather different intervention. Nevertheless, the results are promising, showing the impact of information as opposed to just seeing the petitions. The features of the internet that allow for interaction, associated with Web 2.0 technologies, which allow respondents to see other respondents in real time, could well have an effect on political participation. We believe that the results

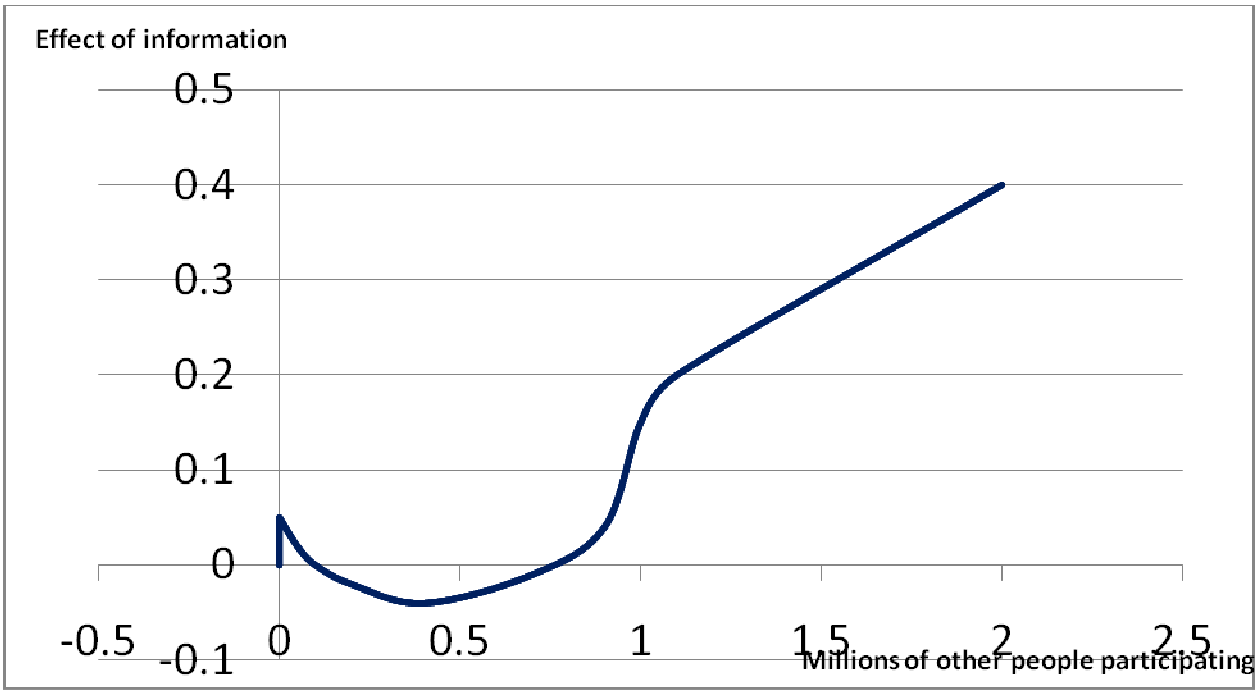
show the size of the numbers matter, much as Olson, and Marwell and Oliver reasoned, with middle numbers depressing participation but with high numbers increasing it. But we need to know that what we observe is the effect is the effect of the numbers on the same petition rather than on different petitions we observe here. Our results could be that people sign more just from knowing the numbers of a certain kind of petition rather than the numbers on their own.

We will address such issues in our next experiment where we have treatment groups that vary the numbers on the same petitions. This experiment will be conducted remotely, more in the field, to enable a larger sample size of around 900. As they will be able to participate at home or a location of their choice, they will receive a rather lower fee of £8. The subjects will also be asked to sign petitions and give money away (although a smaller sum than in the pilot, probably around 20 pence). Subjects will be randomized across three groups, as follows:

- A will receive no information
- B will be told low/medium numbers of others have signed three of the petitions (< 1 million) and that high numbers of others have signed the petition (> 1 million)
- C will be as group B, but with the numbers reversed (i.e for those petitions that had high numbers signing in the other group will have low numbers in this one and vice versa)

For this experiment, we plan to test the hypothesis that there is a non-linear relationship between the number of other people any individual knows to be participating and that individual's likelihood of participating. We have tried to map the hypothetical relationship in Figure 1. Our pilot has lent support to the idea that numbers in some middle range depress participation, while numbers above 'critical mass' (which could be around 1 million) make participation more likely. In this graph, we hypothesise a small positive effect for low numbers, following Olson's argument that small numbers will encourage individuals to feel that they will 'make a difference'. Our pilot has not, however, so far lent significant support to this part of the hypothesis.

Figure 1: Hypothesised Effect of information according to number of people participating



Conclusion

The findings of this pilot experiment should be helpful in providing a methodological pointer for future study of the societal implications of the internet. While internet research abounds with claims of how the internet enhances political participation, empirical evidence is scarce. Experiments of this kind could prove to be a fruitful way to establish specific internet effects, as they have in the field of public administration where members of the same research team have investigated how the changed information environment provided by the internet affects citizen-government interactions (see Escher and Margetts, 2007; Margetts and Escher, 2008; Dunleavy et al, 2007).

The internet is changing the information environment of citizens who use the internet (around three quarters of the UK population), as recommender systems, reputation systems and a whole host of applications labeled 'web 2.0 technologies', based on user generated content, become widespread. Although such technologies are as yet far more common in the commercial domain, there is little doubt that the political world will follow, given the suitability of the internet as a site for political activity. In the US, there is a portent for future elections in the UK, as sites such as YouTube, http://moveon.org and the on-line fundraising activities of some candidates (notably Barak Obama) are clearly having a significant effect on current electoral campaigns by incorporating small-scale activities undertaken by many millions of individuals, with the readily available information about

these activities (such as video clips viewed, activities undertaken, donations made) having a potentially cumulative effect. The No. 10 Downing Street site investigated in this experiment is a small but significant step in this direction. It is important therefore, to develop methodologies to analyze the effect of such technologies on people's willingness to take part in political activity. This experiment, it is hoped, takes a small step towards building the tools necessary to explore the effect of one particular dimension of this increasing automation of political activity; the ability to provide real-time information about the participation of others.

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