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GROUP SIZE AND THE LOGIC OF COLLECTIVE ACTION:

A NETWORK ANALYSIS OF A SWEDISH TEMPERANCE MOVEMENT 1896–1937

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ABSTRACT

In this paper we address the free-rider problem from a network perspective. We suggest that individuals' groups of relevant others are considerably smaller than is usually assumed in the Olsonian tradition. Instead of focusing on the interest group as a whole, we argue that a group of relevant others consists of those to whom the individual is tied through various social bonds. Since these groups tend to be small, social selective incentives are likely to be efficient in inducing individual participation. In testing these ideas empirically, we use microdata on members of a Swedish temperance movement organization during the period of 1896–1937. We estimate how individuals' groups of relevant others are composed with respect to membership in the movement organization and how the composition of the groups affects individuals' decisions to join the movement organization. The results of the analysis support our thesis that additional movement members in the group of relevant others increase an individual's propensity to join a social movement organization. However, the results also lend support to Olson's free-rider thesis: When controlling for the composition of the group of relevant others, additional members in the movement as a whole decrease an individual's propensity to join the movement.

KEY WORDS • collective action • social networks • social incentives • group size

Introduction

By introducing the free-rider problem into sociology and political science, Mancur Olson (1965) once and for all made problematic what earlier was taken for granted, namely, why individuals form and join

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groups for collective action (Marwell and Oliver 1993). Ever since then, social scientists have struggled with this fundamental problem, and they have proposed a range of possible solutions (see Udehn 1993 for a review).

In this paper, we examine the extent to which the share of movement members in a potential member's reference group influences the potential member's decision to join a movement organization. We suggest that an individual's reference group is much smaller than the Olsonian tradition usually assumes. An important implication of this is that social incentives become a potentially important explanatory factor in such settings since, social selective incentives are likely to be of greater importance in smaller than in larger groups (Olson 1965).

We have structured the paper in the following way. First, we briefly summarize the discussion concerning group size and collective action. Then, we present the logic of the mechanism we focus on in this paper, and finally, we derive a set of hypotheses that we test empirically. The data we use for the empirical tests refer to members of a local Swedish temperance movement during the period 1896–1937.

Group Size and Collective Action

According to Mancur Olson (1965), the mobilization of individuals towards a collective good always is problematic. Collective action emerges out of individuals' need for coordinated action in order to provide themselves with a good that they all value. However, as the coordinated group becomes larger, the provision of the collective good no longer depends upon the contribution of any single member. A potential participant can therefore abstain from cooperation since the collective benefits will be provided despite his or her contribution. If all potential participants arrive at this conclusion, the interest group will fail or cease to exist. This leaves us with a deep and important theoretical puzzle, namely how to explain the emergence of collective action under such circumstances. Olson's solution to this free-rider problem is selective incentives. Selective incentives take away the benefits of non-cooperation by rewarding individuals who cooperate, or by making the costs of non-cooperation higher. These incentives can be both material and social.[1]

By social incentives Olson means incentives that involve factors such as the desire for prestige, respect and friendship as well as fear of group harassment. Olson argues that such incentives can be used for the mobilization of potential members, but he also states that they are only

effective in small groups because they can usually only operate in settings characterized by face-to-face contact. Since social incentives are non-material, they must be delivered from one person to another. In larger groups, Olson argues, direct face-to-face contact is less frequent, which makes social incentives less effective. According to Olson, social selective incentives therefore cannot be the solution to the free-rider problem in large groups.

We believe that Olson's reasons for ruling out the importance of social incentives in large group settings are to a great extent accurate. Axelrod and Dion's (1988) game theoretical analyses support this notion. Their results indicate that a precondition for cooperation is that individuals be able to recognize and remember the strategy of the players with whom they have been dealing in the past. Further, for cooperation to emerge there must be a sufficiently high probability of meeting the same player again, otherwise individuals will choose to free-ride (Axelrod 1984). The probability of recognition, remembrance and meeting again declines as the size of the group increases. Hence, evolutionary game theory provides an additional argument for the Olsonian group size hypothesis.[2]

However, as we will discuss in detail later, we believe that Olson grossly overestimates the size of the groups that are normally of importance in situations where individuals make their choices. Consequently, we believe that social incentives are far more important than one is lead to believe from Olson's work.

The Size of the Group

Despite the existence of theoretical arguments for the presence of social influence in large groups (Granovetter 1978; Macy 1991; Marwell and Oliver 1993), we believe that the relevant reference groups tend to be much smaller. Inspired by the theoretical analysis of Crouch (1982), Hechter and Kanazawa (1993), Gould (1995), and partly by Granovetter's ideas of embeddedness (1985), we argue that what is important when individuals are making decisions about joining a movement organization is not the collective as a whole, but the smaller local environment of which they are a part.

As Rogers' (1962) review of the literature on innovation diffusion indicates, while situations and events in society at large are of importance for establishing interest in and attention to something new, it is interpersonal contacts that are of importance when it comes to the actual adoption of the innovation. Studies of recruitment to social movements

have established the existence of similar patterns. Snow et al. (1980) suggest that recruitment within a social network not only is the most common way of recruiting, but that it is also more efficient than other recruitment strategies. Other studies similarly suggest that people do not participate because they are ideologically (McAdam 1988) or economically (Freeman 1973) compelled to, but because they are part of a social structure that participates (see Gould 1995).

However, simply pointing to the empirical association between social networks and the emergence of collective action is not in itself an acceptable explanation—the causal mechanism linking the cause with its effect must also be provided (Elster 1989). We wish to suggest that the Olsonian notion of social incentives provides us with such a mechanism: when individuals consider whether or not to participate in a social movement organization, the individuals in their local network are the providers of essential incentives of a social nature. What happens in society at large is likely to attract individuals' interest, but events in their immediate surroundings are likely to be decisive for their actions.

The group of relevant others in the individual's immediate surrounding typically consists of a small number of individuals, ranging from between five and ten persons (Marsden 1987; Verbrugge 1983). Our guiding hypothesis is that as the share of movement members in these groups increases, social selective incentives become more important, and as a result potential members' likelihood of joining the movement organization also will increase.

Historical Context and Data

We will base our empirical tests on data from a local Swedish temperance lodge within the national temperance movement the 'Independent Order of Good Templars' (IOGT).[3] The temperance movement organized almost half of Sweden's organized population in the early 1900s (Lundkvist 1977). Alcohol-related problems were widespread and the issue of alcohol prohibition was one of the most important social issues at the time. At the national level, the temperance movement fought for a referendum on total prohibition. At this time, universal suffrage was still a few years away (1909 for men, and not until 1921 for women). Consequently, the average person did not have much political influence. In order for the movement to make a difference, mass recruitment was the obvious choice.

The lodge was founded in 1896. During the constitutional meeting, some of the local founding fathers gave their reasons for membership.

'Still we are too few to get them to listen ... but when the numbers get sufficiently high they will be forced to listen.'[4] This indicates that mass recruitment was an explicit strategy of this lodge. It is, of course, possible that the organization at times adopted a different recruitment strategy that focused on a particular group of people. However, since there is nothing in the historical documentation of the lodge that indicates this to be the case (Jansson 1981), we infer that they used a general recruitment strategy.

Was the primary interest of this lodge the production of a collective good? This is an important question since Olson's thesis only applies to such organizations. As far as we can tell from the historical records, the primary aim of the lodge was indeed to produce a collective good. The lodge continued to elect representatives for joint activities with other temperance organizations throughout its existence. It also engaged in political activities at the local level, and it tried to achieve the overall goal of total prohibition of alcohol. The movement to prohibit alcohol clearly constituted activity toward a collective good, and an individual who favored prohibition faced the issue of whether or not to invest time and/or money in promoting the cause. Traditional theory of Olson's is thus applicable and predicts that individuals would opt for the free-rider option.[5]

We have longitudinal data on every member of this lodge from its founding in 1896 until 1937, when the lodge ceased to keep membership records (Jansson 1981). The data base contains information on a total of 569 individuals. We have information on where these members lived, what positions they held within the lodge, and demographics such as their age, gender and occupation. The data base also includes membership information about the local Social Democratic Labor Party and the lodge's youth organization. We have collected other relevant information, such as population size and income levels, from the census. The location of the lodge was in a parish called Husby-Rekarne some 115 kilometers south-west of Stockholm. Most of the members lived and worked in the same parish. The size of the parish was roughly 90 square kilometers (about 56 square miles) and had a population that varied between 1900 and 2500 inhabitants.

Spatial Dimensions and Hypotheses

The main implication of our theoretical discussion earlier is that it is necessary to take the group of relevant others into account in order to explain why single individuals decide to participate in collective action.

In order to identify the group of relevant others, the preferred data involves actual contacts between individuals. However, we are not aware of any longitudinal data set that contains network information of such detail. We have therefore adopted an alternative approach.

A range of earlier studies suggests that social and geographic distance between potential group members influences the composition of such groups. The reason for this appears to be that distances between persons will structure communication and interaction probabilities (Burt 1987; Coleman et al. 1966; Gould 1995; Hedström 1994; Hägerstrand 1967) and that proximity, similarity, and familiarity between individuals tend to increase the probability of face-to-face interaction (Blau 1977; Festinger et al. 1950; Fischer 1982; Friedkin 1983; Gullahorn 1952; Marsden and Friedkin 1994). Therefore, we expect that the probability of two individuals interacting with one another is inversely related to the distance between them. Using information on individuals' positions in social and geographic space should make it possible to approximate the interpersonal networks that are likely to exist in the population.

Festinger et al. (1950) successfully demonstrated that the closer a group of people live to each other, the greater is the probability that friendship evolves and a group becomes established. According to Verbrugge's (1983) analysis of adult friendship contact, geographical distance indeed was the most important predictor of frequent interaction (see also Hägerstrand 1967). Therefore, it seems reasonable to assume that individuals who live close to members of a social movement organization are more likely to interact with them and to have a group of relevant others composed of many movement members.

Besides geographic proximity, Gans (1961) has argued that homogeneity in age and socioeconomic status increase the friendship potential. This is supported by Wright and Cho (1992), who found that social boundaries constitute obstacles to the formation of friendship ties, and by Boissevain (1974), who found age differences to be an important obstacle. For the same reasons as above, it seems reasonable to assume that individuals who are similar in age and social status to members of a social movement organization are more likely to interact with them and to have a group of relevant others composed of many movement members.

The above predictions together with the previous discussion about social selective incentives allow us to formulate the following hypotheses:

- Hypothesis 1: The shorter the geographic distances are between a

potential member and actual members, the more likely the potential member is to become an actual member.

- Hypothesis 2: The smaller the occupational/class differences are between a potential member and actual members, the more likely the potential member is to become an actual member.
- Hypothesis 3: The smaller the age differences are between a potential member and actual members, the more likely the potential member is to become an actual member.

So far, we have only discussed factors that are likely to promote an individual's probability of becoming a member. However, if the small group is the relevant reference group, and if this group to a large extent consists of former members, there exists a possibility that social selective incentives will discourage participation. The effect of such negative social incentives is a topic that the collective action literature seldom addresses (Sandell 1995). Two exceptions are Gould (1995) and McAdam (1986), who found that former participants' experiences discouraged potential participants. Therefore, it seems reasonable to assume that individuals proximate to former members of a social movement organization are more likely to interact with them and have a group of relevant others composed of many former members. This prediction, together with the expected effects of discouraging social incentives, leads us to test the 'negations' of hypotheses 1, 2 and 3 in the empirical analysis as well.

Method

The most practical way to handle distance measures, such as those discussed earlier, is to create square matrices, the entries of which are the distances between pairs of individuals. To obtain a square matrix of the geographic distances between pairs of individuals we measured the distances between the 79 different locations in which the 569 individuals included in our study resided.[6] This resulted in a [569 × 569] matrix (**G**), with information on distances in kilometers between the 161 569 pairs of individuals in the data base.[7] We then inverted the cell entries in this matrix, since we assume that contact is a decaying function of distance.

We obtained the matrices of distances in social space in a similar fashion. First, we ranked the nine occupational categories to which the 569 individuals belonged on the basis of average income. We then used this information to obtain the desired [569 × 569] matrix (**S**) of inverted

occupational distances.[8] Finally, in a parallel fashion, we obtained a matrix (**A**) of inverted age differences.

To estimate the share of movement members included in an individual's reference group, we post-multiplied each of these matrices, assumed to measure the probability of two individuals belonging to the same group of relevant others, with a [569 × 1] column vector, **M**. The cell entries in this vector are equal to 1 if an individual is a member of IOGT at time *t* and 0 otherwise:

$$\mathbf{Y}_t = \mathbf{G}_t\mathbf{M}_t \qquad \mathbf{Z}_t = \mathbf{S}_t\mathbf{M}_t \qquad \mathbf{X}_t = \mathbf{A}\mathbf{M}_t \tag{1}$$

where:

- $\mathbf{M}_t$ = a [569 × 1] column vector of membership information, which takes the value 1 if the person is a member at time *t* and 0 (zero) otherwise.
- $\mathbf{G}_t$ = a [569 × 569][9] matrix of contact probabilities given by the geographical distance at time *t*.
- $\mathbf{S}_t$ = a [569 × 569] matrix of contact probabilities given by class/occupational differences at time *t*.
- **A** = a [569 × 569] matrix of contact probabilities given by age differences.

The entries of the column vectors resulting from these operations—**Y**, **Z** and **X**—can be interpreted as proxy measures of the proportion of movement members in individual *i*'s group of relevant others at time *t*.

To derive the variables we need to test the 'negations' of hypotheses 1–3, we substitute the vector **M** with a new vector **D** in equation 1 above. The new vector **D** also is a 569 × 1 column vector, but the cell entries here are 0 before and during the years an individual is a member. In the year the individual leaves the organization, the cell entry takes the value 1. In the following years, the value declines exponentially because the influence of a departure is likely to decline as time passes.[10] The entries of the new column vectors that result from these operations—**y**, **z** and **x**—can be interpreted as proxy measures of the proportion of former movement members included in individual *i*'s group of relevant others at time *t*.

Other covariates that we use in the analysis include the individual's occupation, age and gender. To control for certain macro events, we also include a dummy variable 'Referendum', which captures the impact of the Swedish referendum on prohibition in 1923 (the vote resulted in a majority against prohibition). It is likely that the referendum had a lasting impact and therefore we coded the dummy 0 until the year before

the referendum and 1 afterwards. We also included variables that measure the size of the lodge's youth department and the local Social Democratic Party (SAP), because it is likely that the two organizations (IOGT and SAP) influenced each other (Stern, forthcoming).[11] Finally, we controled for the population size of the municipality as well as time.

The Model

Following the examples of Strang (1991), we use event history methods to analyze the mobilization process. In doing this, we are modeling the micro-level process. Since the data contain information on an annual basis, it is appropriate to use a discrete-time event history approach (see Allison 1982). This means that we have to change the observations into person-years, where each individual contributes as many observations as she/he is at risk of becoming a member. We will only consider individuals as having been potential members if they were between 15 and 65 years of age.

We will focus on the time at which the individuals joined the lodge and examine how the timing of that event was related to covariates that describe the individuals themselves, the context at the time and the actions of other individuals. Thus, we will estimate the parameters of the following equation:

$$\ln\left(\frac{p_{it}}{1 - p_{it}}\right) = a + \Sigma\, \psi_k m_{kt} + \Sigma\, \gamma_k n_{ikt} + \beta_1 Y_{it} + \beta_2 Z_{it} + \beta_3 X_{it} + \beta_4 y_{it} + \beta_5 z_{it} + \beta_6 x_{it} \qquad (2)$$

where:

- p_{it} = the conditional probability that individual i will become a member at time t, given that he/she was not a member at $t - 1$.
- m_{kt} = values at time t on the k contextual factors likely to influence the likelihood of i becoming a member.
- n_{ikt} = individual i's values at time t on the k individual specific factors likely to influence the likelihood of i becoming a member.
- Y_{it} = the expected share of members in individual i's group of relevant others, generated from data on geographical distances (see equation 1).

Table 1. Logit estimates of the probability for joining the IOGT lodge, 1896 to 1937 (*z*-values in parentheses)

	Models					
Variables	1	2	3	4	5	6
Constant	−115.323	−97.531**	−103.484	−71.562**	−60.533*	−68.701**
	−(4.441)	−(3.811)	−(4.011)	−(2.777)	−(2.360)	−(2.791)
Time	−0.066**	−0.072**	−0.070**	−0.064**	−0.067**	−0.076**
	−(3.289)	−(3.724)	−(3.486)	−(3.344)	−(3.497)	−(4.187)
Time^2	−0.005**	−0.004**	−0.005**	−0.005**	−0.004**	−0.005**
	−(4.229)	−(3.336)	−(4.225)	−(4.564)	−(4.096)	−(4.453)
Referendum	0.351	0.200	0.381	0.443	0.319	0.325
	(1.261)	(0.704)	(1.364)	(1.556)	(1.101)	(1.172)
Population	15.414**	13.000**	14.002**	9.419**	8.169*	9.023**
	(4.583)	(3.925)	(4.193)	(2.819)	(2.459)	(2.830)
SAP	−0.016**	−0.013**	−0.015**	−0.011**	−0.009*	−0.008*
	−(4.610)	−(3.751)	−(4.173)	−(2.987)	−(2.459)	−(2.476)
IOGT's youth	0.003	0.002	0.002	−0.001	−0.002	−0.001
organization	(1.206)	(0.749)	(0.945)	−(0.351)	−(0.644)	−(0.423)
Number of	0.023**	0.017**	0.012**	0.002	−0.010*	−0.009*
members	(7.707)	(5.355)	(3.266)	(0.408)	−(2.261)	−(2.142)
Number of former	−0.463**	−0.235**	−0.371**	−0.233**	−0.118	−0.107
members	−(6.363)	−(2.937)	−(4.249)	−(2.793)	−(1.253)	−(1.232)
Cat2: Yeomen,	−0.213	−0.223	−0.797*	−0.191	−0.734	−0.731*
tenants	−(0.623)	−(0.642)	−(2.186)	−(0.553)	−(1.960)	−(2.072)
Cat3: Craftsmen,	−0.367	−0.463	−1.418**	−0.377	−1.532**	−1.284**
teachers	−(1.245)	−(1.538)	−(3.605)	−(1.258)	−(3.779)	−(3.357)
Cat4: Soldiers	−0.253	−0.190	−0.543	−0.227	−0.496	−0.389
	−(0.644)	−(0.479)	−(1.363)	−(0.572)	−(1.217)	−(1.015)
Cat5: Crofters	−0.383	−0.238	−0.923**	−0.357	−0.795*	−0.604
	−(1.220)	−(0.732)	−(2.704)	−(1.125)	−(2.219)	−(1.792)
Cat6: Farm	−0.469	−0.542	−0.921**	−0.477	−1.047**	−0.813*
laborers, cotters	−(1.469)	−(1.665)	−(2.708)	−(1.476)	−(2.977)	−(2.459)
Cat7: Farm hand,	−0.496	−0.584	−1.058**	−0.507	−1.364**	−1.046**
maid	−(1.693)	−(1.953)	−(2.975)	−(1.704)	−(3.700)	−(3.012)
Cat8: Day laborers	−0.174	−0.218	−0.271	−0.175	−0.363	−0.219
(farming)	−(0.464)	−(0.576)	−(0.722)	−(0.462)	−(0.944)	−(0.604)
Cat9: Factory	−0.223	−0.311	−1.076**	−0.260	−1.260**	−0.975**
workers	−(0.752)	−(1.028)	−(2.877)	−(0.865)	−(3.253)	−(2.672)
Gender	0.051	0.013	0.090	0.030	0.038	0.025
	(0.509)	(0.125)	(0.885)	(0.292)	(0.371)	(0.256)
Age	−0.296**	−0.293**	−0.293**	−0.132**	−0.159**	−0.132**
	−(10.312)	−(10.260)	−(10.252)	−(3.346)	−(4.068)	−(3.477)
Age^2	0.003**	0.003**	0.003**	0.001	0.001*	0.001
	(6.077)	(6.059)	(6.096)	(1.554)	(2.293)	(1.642)

Table 1. Continued

Variables	Models 1	2	3	4	5	6
$Y_{it}^{\dagger}$ (Geographic)		0.625**			0.567**	0.455**
		(8.381)			(7.496)	(6.458)
$y_{it}^{\dagger}$ (Geographic)		−0.572**			−0.513**	−0.403**
		−(7.649)			−(6.727)	−(5.710)
$Z_{it}^{\dagger}$ (Class/occupation)			0.523**		0.401**	0.362**
			(4.778)		(3.587)	(3.439)
$z_{it}^{\dagger}$ (Class/occupation)			−0.134*		0.050	0.027
			−(2.075)		(0.731)	(0.423)
$X_{it}^{\dagger}$ (Age)				0.787**	0.729**	0.604**
				(7.401)	(6.709)	(5.902)
$x_{it}^{\dagger}$ (Age)				−0.457**	−0.371**	−0.376**
				−(5.793)	−(4.473)	−(4.703)
Log Likelihood	1738	1695	1726	1703	1660	2146
χ^2,. (d.f.): comparing model 1 with model 2–3	N.A	86**, (2)	24**, (2)	70**, (2)	N.A	N.A
χ^2,. (d.f.): comparing model 1–4 with model 5	156**, (6)	70**, (4)	132**, (4)	86**, (4)	N.A	N.A
N =	13625	13625	13625	13625	13625	30292

** = Significant at less than the 0.01 level.

* = Significant at less than the 0.05 level.

† = Standardized variable values, mean zero, standard deviation one.

The omitted category when controlling for the individuals' own class/occupation is 'Estate owner, manufacturers, ministers'. The omitted category when controlling for gender is women. The first χ^2 is obtained by comparing model 1 with each of models 2–4 in order to establish if the more parsimonious model 1 performs significantly worse than the other models. Hence, significant values indicates that model 1 is inferior to model 2, 3 or 4. Similarly, the second χ^2 is obtained by comparing model 1–4 with model 5 in order to establish if either of the four models are equally good as model 5—significant values indicates that they are not.

accelerating rate over time. This pattern is similar to the overall trend for the entire temperance movement in Sweden (Lundvist 1977).

Since we lack information about those individuals who never became members of the lodge, sampling bias is a potential concern.[13] One way to control for sampling bias is to gather additional information on the remaining non-member population. Another possibility is to simulate some of the information that we lack and examine how robust our

estimates are when we include this additional information. In this paper we have adopted the latter strategy. The method we used is straightforward, we just appended a duplicate of each sample member to the original sample. This is a reasonable method since people outside the lodge to a great extent shared the demographic characteristics of those inside the lodge (see Jansson 1981). The only difference between the sample members and their duplicates is that we coded the latter as if they never became members of the lodge. The result from this analysis (model six) is, in all relevant respects, similar to the results in model 5. This indicates that the coefficients reported in model 5 are fairly robust with respect to possible sampling biases and strengthen our confidence in the results.[14]

Conclusion

Various sociological theories suggest that the behavior of others is a very important, if not the most important, factor in explaining people's actions. We have argued in this paper that these kinds of mechanisms are likely to carry little or no importance in the settings of larger groups, since access to information about, and monitoring of, individual actions are increasingly difficult as groups grow larger. Mancur Olson's original conclusion, which ruled out informal sanctioning mechanisms in larger groups, is probably correct. The question then is: Does this also rule out the possibility that social selective incentives are important when organizations overcome the free-rider problem? Our answer is no, since we believe that large groups are compilations of smaller groups (Crouch 1982) and that in these smaller groups informal social incentives are possible (Hechter 1987).

Our findings support Olson's idea that social selective incentives cannot be the solution to the free-rider problem in large groups. However, and more importantly, our findings also support the idea that social selective incentives are indeed operating in the smaller local environment of which individuals are a part. One implication of this is that Olson overestimated the size of the group that is normally of importance in situations where individuals form their choices. Theoretically, this means that Olson's latent group concept has to be refined and perhaps even redefined. One further consequence of this is that social selective incentives are far more important than one is led to believe from Olson's work.

A more general implication of this study is that to view society as

compiled of groups on different levels of aggregation is likely to render important insights on how explanatory factors, such as the number of members in a social movement organization, can differ in their effects across levels of aggregation. In terms of the results we have presented here, the effect of the number of members in a social movement organization belonging to one's own group of relevant others increased the likelihood of becoming an actual member. In contrast, the number of members belonging to another's group of relevant others decreased the likelihood of becoming an actual member.

Thus, to sum up this discussion we believe that a theoretical approach that combines network theory and rational choice theory appears to be of the utmost importance for the study of social movements, as well as for social theory more generally (see e.g. Hedström, forthcoming). It is our conviction that one cannot fruitfully analyze behavior as if it were formed in isolation from the behavior of others, or ignore the question of who the likely others are. If we want to explain individuals' decisions whether or not to join a social movement, this has to be done by considering the structure of interaction among individuals. However, network studies are complex and demanding as far as data are concerned. In this paper, we were forced to make estimates of likely interpersonal ties from what we believe are reasonable theoretical assumptions about individuals' local environments. A possible and natural way of extending the research reported here would be to collect data on the actual web of ties among individuals.

NOTES

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1. Heckathorn (1998) has suggested that secondary sanctions, such as norms, can also resolve the free-rider problem. Norms might have interfered with people's propensities to engage in collective action in our case, but for analytical purposes we will restrict our analysis to selective incentives.
2. Contrary to Olson's notion on group-size, Marwell and Oliver (1993) have demonstrated that, under certain circumstances, successful collective action follows from increased group-size. The key to their analysis is that when an interest group grows larger, the probability of the inclusion of outliers with high interest and sufficient

resources to provide the good increases. We believe that Marwell and Oliver's prediction is correct, although we also believe that their argument still relies on the small group, since it is a requirement that the ones with resources can interact and coordinate their actions in order to achieve the collective good (Marwell and Oliver 1993, 53–4).

3. These data have been collected by Professor Torkel Jansson of the Department of History at the University of Uppsala (see Jansson 1981). The coding was performed by the authors.
4. Said by the first chairman, blacksmith C. Jånsson, at the lodge's constitutional meeting, quoted in Jansson 1981, 112–13. Our translation.
5. Still, one might argue that a lodge like this over time turns into something similar to a social club. One way to assess this is by discussing the lodge's internal activities. If the lodge turned into a social club, it is not very likely that they would have a formal organization, carry out internal elections, keep meeting protocols, or investigate possible violations of the rules. This lodge continued doing these activities throughout its existence.
6. Since we have information about where the individuals lived and also have access to a map for the time of the study, we used road distance to assess the geographic proximity among the individuals.
7. The method we used to generate the individual by individual matrices for geographical and social space is given by the equation (with geographical distance as an example): $\mathbf{G} = (\mathbf{CL})'\mathbf{C}$ where **L** is a (79*79) location by location matrix, and **C** is an individual by location matrix that takes the value 1 if the individual lives at the location and 0 (zero) otherwise. We set the matrix diagonal to equal 0 (zero) for all matrices, which prevents the individual from being included in his/her own group of relevant others.
8. The reason for using nine categories is that Jansson (1981) originally coded the individuals into these categories. We later derived the distances between categories by using typical wage differences between occupations.
9. Since we have information about mobility, social as well as geographic, we implemented this information whenever this occurred by estimating new distance matrices, which explains the notation *t* for the matrix $\mathbf{G}_t$ as well as for $\mathbf{S}_t$. In contrast, age differences are constant over time, which explains the absence of the notation *t* for the matrix **A**.
10. Strang and Tuma (1993) have labeled this temporal heterogeneity. They have argued that it is likely that time will lessen the influence on individuals' future choices. The solution suggested by them is a simple exponential decline of influence. Choosing the speed of the decline is somewhat arbitrary, and it is not certain whether the same rate applies to all dimensions. We tried various rates, which all proved similar with respect to model fit. The rates finally chosen were 0.8 for the geographic measure, 0.7 for class/occupation and 0.9 for age.
11. It has previously been shown that the temperance movement sometimes functioned as an 'organizational school' for the SAP. The temperance movement initially championed issues that were later taken over by the SAP (Lundkvist 1977).
12. A potential problem of introducing both the positive and the negative measure simultaneously is collinearity. As a rule of thumb, a Pearsson correlation coefficient higher than 0.7 is usually a problem. The descriptive statistics for our data do not reveal any such problems. We also performed regressions, introducing only one of the two measures at a time. Since the estimates from those regressions did not differ in

any significant way from the estimates we obtained when we introduced the variables together, we have chosen to present the positive and the negative measures simultaneously.

13. See Berk (1983) and Winship and Mare (1992) for a discussion of possible effects of sampling biases and models for dealing with them.
14. The variables we used here behaved similarly, when the analysis was done instead on drop-out propensities (Sandell 1995). When analyzing drop-outs, it is the members who constitute the population. This indicates that the variable construction is reliable and that the results we have obtained are not a result of the truncated sample itself.

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