

# Mesolevel Networks and the Diffusion of Social Movements: The Case of the Swedish Social Democratic Party<sup>1</sup>

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In analyzing the spatial diffusion of the Swedish Social Democratic Party, this article introduces the notion of a mesolevel network. A mesolevel network is a social network that differs in three important respects from interpersonal microlevel networks directly linking prior and potential adopters of a practice to one another: (1) it is generated by a different causal process than the microlevel network; (2) it tends to be much sparser than the microlevel network; and (3) the typical edge of a mesolevel network bridges much longer socio-metric and geographic distances than the typical edge of a microlevel network. These types of mesolevel networks are important because they can dramatically influence the speed at which a contagious practice will diffuse. The mesolevel network focused upon in this article is the network that emerged out of the travel routes of political agitators affiliated with the Social Democratic Party. Computational modeling shows that the diffusion of the Social Democratic Party is likely to have been considerably influenced by the structure of this network. Empirical analyses of the founding of party organizations during the period 1894–1911 support these theoretical predictions and suggest that this mesolevel network was of considerable importance for the diffusion of the Swedish Social Democratic Party.

## INTRODUCTION

In Sweden, as in most other Western societies, a range of new social movements emerged at the turn of the 19th century. For most ordinary

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citizens, this was a unique historical period. For the first time ever, they were in great demand, and various interest groups competed fiercely for their allegiance (Johannesson 1994). One of the most important social movements that emerged during this era was the labor movement. The Swedish labor movement became one of the most influential labor movements in the Western world, and it shaped the development of Swedish society during the 20th century considerably.

Compared to other important social movements of this period—such as the temperance movement and the free-church movement<sup>2</sup>—the growth of the labor movement was rather formidable. The Social Democratic Party was founded in 1889. By 1911, party organizations had been established in most parts of the country, and in the election of 1914, the Social Democratic Party was already the largest political party in Sweden. In this article, we will focus on the formative years of the Social Democratic Party, and we will analyze how it diffused across Sweden.

Research on diffusion processes has traditionally focused either on unstructured mass media effects influencing all potential adopters in a similar way or on interpersonal networks directly linking prior and potential adopters of a practice. However, as suggested by Gould (1991), Hedström (1994), and others, most diffusion processes are likely to be the result of influence processes operating in multiple overlapping networks of varying density and reach.

In this article, we introduce the notion of a mesolevel network. A mesolevel network, as the term is used here, is a social network that differs in three important respects from interpersonal microlevel networks directly linking prior and potential adopters of a practice to one another: (1) it is generated by a different causal process than the microlevel network, (2) it tends to be much sparser than the microlevel network, and (3) the typical edge of a mesolevel network bridges much longer sociometric and geographic distances than the typical edge of a microlevel network. Mesolevel networks are likely to have similar effects on diffusion processes as the small-world networks analyzed by Duncan Watts (1999). Even just a few mesolevel edges spanning long sociometric distances can dramatically reduce the average geodesic (shortest path) distance between actors in very large networks and, thus, increase the speed at which a contagious practice (in this case, a social movement) will diffuse.

One mesolevel network of considerable potential importance for the diffusion of the Social Democratic Party is the network that emerged out

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<sup>2</sup> The free-church movement consisted of various nonconformist Protestant denominations that were established outside of the Swedish State church.

of the activities of social democratic agitators. In addition to the fact that these agitators were often charismatic leaders who could generate considerable support for their cause, they created, as an unintended by-product of their traveling, a mesolevel network that directly linked groups of workers in remote regions to one another. The article is organized as follows. First, we give a brief background to the role of political agitators in Swedish labor history. We then discuss the social mechanisms likely to have generated the network effects we are focusing upon. A computational model thereafter is used to show how mesolevel networks are likely to influence diffusion processes. Finally, we empirically examine the role played by mesolevel networks in the spatial diffusion of the Social Democratic Party during the period 1894–1911. The article concludes with a brief discussion of the general implications of these results for the diffusion of social practices.

### Agitators in Swedish Labor History

The first known socialist agitation in Sweden was a speech that took place on November 6, 1881, in the city of Malmö. It was held by August Palm, a tailor who returned to Sweden after several years in Germany and Denmark. After his first famous speech, entitled “What Do Socialists Want?” August Palm began to travel around Sweden, agitating for the social democratic cause.<sup>3</sup> He was soon to be followed by other agitators, likewise enthusiastic and convinced individuals.<sup>4</sup>

In many respects, the early political agitators resembled the traveling religious revivalists of the era. The early agitators were individuals with a “mission,” barely managing on the money they earned from selling pamphlets and newspapers. In the descriptions of these individuals, it is evident that they were often charismatic, with an almost religious attitude

<sup>3</sup> During 1881–87, August Palm visited on the average approximately one place per month. We have calculated this number on the basis of the number of places mentioned in his memoirs (Palm 1979). This figure should not be taken too literally; it is only a rough indicator of how much traveling he did. Palm first mentions the existence of other agitators in 1887.

<sup>4</sup> The annual yearbooks of the Social Democratic Party lists a total of 43 agitators who were active during this period. These agitators were a rather heterogeneous group of people. A famous, charismatic, and eccentric agitator was “Texas” Ljungberg, who received his nickname because he always wore a big black hat. Kata Dahlström was an influential female agitator with an upper-class background, and Hjalmar Branting, usually considered the founding father of the Social Democratic Party, had an astronomy degree and was the son of a professor.

toward their task (Mral 1996; Palm [1904–1905] 1979; Palmgren 1970).<sup>5</sup> Their mission was to awaken, enlighten, and organize the people in accordance with social democratic ideas (Johannesson 1992).

Starting in 1903, two full-time agitators were employed by the party. Their primary tasks were to organize new members, assist in starting up new labor organizations, and affiliate existing labor organizations with the party (Johannesson 1996, p. 27).<sup>6</sup> The growth and transformation of the social democratic movement into a well-organized political apparatus created less need for agitation. After 1911, the annual yearbooks of the Social Democratic Party no longer contained any special reports about agitation. Many agitators became regional ombudsmen, and the age of agitation was over.

When assessing the importance of these agitators for the Swedish Social Democratic Party, it is essential to distinguish between their symbolic importance, on the one hand, and their actual importance for the diffusion of the movement, on the other. In terms of their symbolic importance, their impact is obvious (Engman 1992; Johannesson 1992). The social democratic agitators have often been profiled in fiction (Engquist [1978] 1991), and the agitators themselves wrote popular recollections and memoirs (Palm 1979; Dahlström 1914; Ljungberg 1917; Elmgren [1920] 1979). Even today, many social democrats regard the early agitators as mythical figures who embody the central ideas of the party (Engman 1992). When it comes to their actual impact on the spread of the Social Democratic Party, however, much less is known. The party leaders obviously thought they were important since they were willing to allocate scarce resources to agitation. However, some contemporary Swedish labor historians, like Åmark (1986), maintain that the agitators' impact on party success was only marginal. As far as we know, however, the research being reported here is the first effort to assess their importance in a more systematic way.

<sup>5</sup> August Palm, himself, often drew parallels between the persecution of the early Christians and the persecution of socialists (Josephson 1996). The religious parallel is also evident in the early pamphlets, which used an emotional and religiously colored rhetoric (Hedström and Josephson 1996).

<sup>6</sup> The agitators often targeted areas with little or no social democratic activity. For example, they paid special attention to the industrial estates in the Bergslagen region where many workers resided, but where the power of the estate owners, "*brukspatronerna*," made mobilization difficult (see Mral 1996, p. 55). The situation was similar in the farm districts, where a significant part of the local population was farm day laborers. Many farmworkers did not identify themselves as workers, and they were often skeptical of socialist ideas (Johannesson 1996, pp. 14–15). For these reasons, agitators visited these areas frequently.

## NETWORK EFFECTS AND CAUSAL MECHANISMS

Previous research on social movements clearly suggests that the structure of network ties is a potentially important factor influencing the growth and spread of social movements. For example, Snow, Zurcher, and Eklund-Olson (1980), among the first to highlight the importance of social networks for the recruitment of individuals to social movements, showed that movement members were largely recruited through pre-existing ties to movement members. McAdam's (1988) detailed study of participants in the 1964 Mississippi Freedom Summer project confirmed the results of Snow et al. and underscored the importance of network ties. Two studies of Swedish social movements have also examined the role of social networks. Hedström's (1994) study suggested that network ties were pivotal for the spatial diffusion of Swedish trade unions, and Sandell and Stern's (1998) analysis of a local temperance movement showed that ties to movement members considerably increased the likelihood of individuals joining the movement.

Although most of these studies have been concerned with the role of networks in recruiting members to *existing* movement organizations, they are important for understanding the process that generates *new* movement organizations as well. The founding of a movement organization is also the result of individual decisions and is therefore just as likely to be influenced by the past decisions of those to whom the individuals are connected (see Hedström 1994; Strang and Soule 1998). But why do we observe these network-based interdependencies? Simply to point out the existence of an empirical association between a network variable and the event to be explained is not in itself a fully acceptable explanation. The causal mechanism providing the link between the cause and the effect must also be provided (see Elster 1989; Hedström and Swedberg 1998).

Specifying causal mechanisms is particularly important in the context of network and spatial analysis because contextual effects are often difficult to distinguish empirically from genuine network effects. Unless we have strong prior reasons for expecting genuine network effects, that is, that the action of an individual or group of individuals is indeed the impetus for another individual's action, it seems safer to assume that observed spatial or network associations are simply due to omitted variables. The following example from Max Weber helps to clarify the point: "Social action is not identical with the similar actions of many persons. . . . Thus, if at the beginning of a shower a number of people on the street put up their umbrellas at the same time, this would not ordinarily be a case of action mutually oriented to that of each other, but rather of all reacting in the same way to the like need of protection from the rain" (Weber [1921–22] 1978, p. 23).

This piece of everyday behavior is not “social action” explained by some form of network-based interdependence, but is due to a rainfall that makes all actors adjust their action in a similar manner. However, if we do not control for this environmental or contextual change, we are likely to observe spurious spatial or network effects indicating that the individuals indeed influenced each other’s actions. Assume that Weber’s rainfall started at one end and gradually spread along the street. The pattern of umbrella use then would “diffuse” in a similar manner and could easily give the impression of being a genuine network effect, where one individual’s umbrella use increased the likelihood that a neighboring individual would use an umbrella as well.

These difficulties of distinguishing empirically between social contagion and individual adjustments to a common source of influence are well known in the literature and typically require that the causal mechanisms be clearly specified.<sup>7</sup> We will therefore briefly discuss some “elementary” social mechanisms that we believe may have been of importance for the founding of social democratic party organizations, and on the basis of these mechanisms, we will formulate a number of hypotheses to be tested empirically. The types of mechanisms considered here can be classified as being either a form of *imitation* or *persuasion*.

### Imitation

An actor, *A*, can be said to imitate the action of another actor *B*, when *A*’s observation of *B*’s action affects *A* in such a way that *A*’s subsequent actions become more similar to the observed action of *B* (see Flanders 1968). For example, if an individual’s propensity to start a local social movement organization increases as a consequence of the individual’s observing other individuals starting or joining movement organizations, the action is imitative. However, simply labeling the action as imitative does not explain it; we also need to understand why individuals imitate the actions of others.

In the sociological literature on imitation, the reasons why actors follow the leads of others have rarely been sufficiently analyzed (see Hedström 1998). Either, as in the case of Le Bon ([1895] 1960), Tarde (1903), and their followers, the analysis has been based on the rather untenable assumption that action is purely *reactive*, without any meaningful orien-

<sup>7</sup> See Coleman, Katz, and Menzel (1957) for an early and influential study trying to distinguish between these different types of influences.

tation toward the actor being imitated.<sup>8</sup> Or, as in much of the sociologically oriented economics literature (e.g., Jones 1984; Becker 1991), the assumption has been that actors are *conformists* who have an overarching desire to be and to act like others. However, a general and pervasive desire for conformity seems to be a rather unlikely explanation for the type of action being analyzed here.

In our view, a much more plausible explanation focuses on individuals' beliefs rather than on their desires. From this perspective, imitation is not seen as being primarily the result of a dislike for being different, but is rather explained by the perceived usefulness of imitation. This form of imitation, learning from the experiences of others, is a highly rational form of decision making when the relation between means and ends are difficult to assess (see Hedström 1998). This decision heuristic is practiced in the most varied sets of circumstances, from mundane everyday activities such as when to decide which fork to use for the first course of a dinner (Cialdini 1984), to intricate organizational decisions such as those described in Cyert and March (1963).<sup>9</sup>

Given this perspective, an important reason for expecting network effects is that prior decisions made by other actors provide *information* that influences the individuals' beliefs about the likely consequences of founding an organization. Particularly before a social movement has become established (the type of situation considered here), the choice tends to be highly ambiguous, and the likely consequences are difficult to assess. In ambiguous situations like these, actors can at best arrive at informed guesses about the likely effects of starting an organization, guesses that are influenced by the available information. However, as suggested by Coleman, Katz, and Menzel (1957), if individuals are influenced by the actions of other individuals largely because of the ambiguities of the choice situation, we should expect that the extent of that influence should diminish as more and better information becomes available. To the extent that this type of mechanism is operating, we should expect to find (1) that individuals' likelihood of forming a party organization is positively related to the number of other individuals that are known or believed to join the party in other locales, and (2) that these effects decline with the passage of time as more information gradually becomes available.

<sup>8</sup> Le Bon, for example, made only vague and unsubstantiated references to a "natural tendency to imitate" (1960, p. 126) and to a "law of the mental unity of crowds" (1960, p. 24).

<sup>9</sup> See Kuran (1995) for a range of illuminating examples of this heuristic, and Merton's (1968) analysis of self-fulfilling prophecies for a classic sociological example.

Persuasion

The other semigeneral mechanism we focus on here is persuasion. By this concept, we mean the following: An actor *A* can be said to be persuaded by another actor *B* when *B*'s verbal (oral or written) interaction with *A* affects *A* in such a way that *A*'s subsequent action becomes more similar to the action advocated by *B*. Persuasion, thus, is an example of an intentional form of social influence, where *B* is actively trying to affect *A*'s actions. In this respect, persuasion differs from imitation, where *B*'s actions also influence *A*'s future action, without this influence necessarily being intended by *B*.

In the sociological literature, persuasion has usually been analyzed with reference to the notion of "charisma" (see Lindholm 1990). From the historical records, it is obvious that the successful agitators and local party organizers possessed an unusual ability to persuade their audiences (see Mral 1996, p. 6). The following account of an individual who participated in a meeting with the agitator "Texas" Ljungberg is illustrative:

And then came the lecturer, a slender young man dressed in black, with a big hat on his head and the club scarf around his neck. He proclaimed to the public what social democracy was and what it wanted to do for the "small ones" of society. It was entirely different from what I had expected, and everything he said I appropriated with all my soul and senses. I realized that this was the saving hand reaching out to oppressed people, and I absorbed every word. These people, with this proclamation, were my people! . . . I can still see Ljungberg, where he stood like a young thunder-god in front of the howling crowd. (Aron Gahrén quoted in Johannesson 1992, p. 8; our translation)

Although the charisma of the agitators was of crucial importance, it seems rather unlikely that temporary awakenings of this kind were the full story. Most likely, the social context in which the agitation took place also mattered a great deal. For example, it seems likely that the agitators were particularly decisive in social contexts that for other reasons—social, demographic, or economic—were ripe for a party organization to be formed.

To the extent that this type of mechanism was operating, we should expect (1) that the visit of an agitator to a particular town or district considerably increased the likelihood of a party organization being formed there, (2) that the effect of this visit was conditioned by other social and demographic factors, and (3) that the effect of a visit by an agitator declined with the passage of time because the choice situation gradually became less ambiguous.



## MESOLEVEL NETWORKS

In addition to being charismatic persons with an unusual ability to persuade their audiences, the agitators often functioned as brokers or intermediaries who carried information from one place to another. The agitators often reported on social democratic activities and actions by adversaries in other, more distant districts. In carrying such information from one group or district to another, the agitators created information links that made imitation at a distance possible. Accounts of events and activities in distant districts gave people access to information that allowed them to better assess the likely consequences of founding a party organization.

The structure of this information network was by and large an unintended by-product of the agitators' visits to different places. However, when one examines the historical records of how these agitators traveled across Sweden, the traces of a network emerge. This network is a mesolevel network: it is a low-density network with edges bridging long sociometric and geographical distances, and these edges have been generated by a different causal process than the edges of the interpersonal microlevel network. In order to fully understand how these networks are likely to have influenced the diffusion of the Social Democratic Party, it may be useful to refer to the hypothetical networks in figure 1.

The mesolevel network in figure 1 describes the hypothetical travel route of an agitator. The agitator first visits district *A* in the southeastern part of Sweden and exerts an influence on those in district *A*. The vertical arrow between the maps at point *A* represents this influence. If a social democratic organization was founded in district *A*, the members of this organization may influence other individuals in their local surroundings, who, in turn, may influence yet other individuals in their local surroundings. The horizontal arrows originating from point *A* in the lower map represent this local influence and this locally bounded network we refer to as a "microlevel network."

Next, the agitator visits district *B* in the northern part of Sweden, and the same process unfolds again. But in addition, the agitator's travels between *A* and *B* establish an edge from *A* to *B*. The horizontal arrow in the upper map between points *A* and *B* represents this edge, and the network that is formed of these types of edges is an example of a mesolevel network. Through the edges of this mesolevel network, events in district *A* may directly influence the course of development in district *B* because information about events in *A* now can reach those in *B* in a fast and direct way.<sup>10</sup> Thus the existence of these types of mesolevel networks are

<sup>10</sup> This type of mesolevel network thus exhibit some similarities with the type of be-

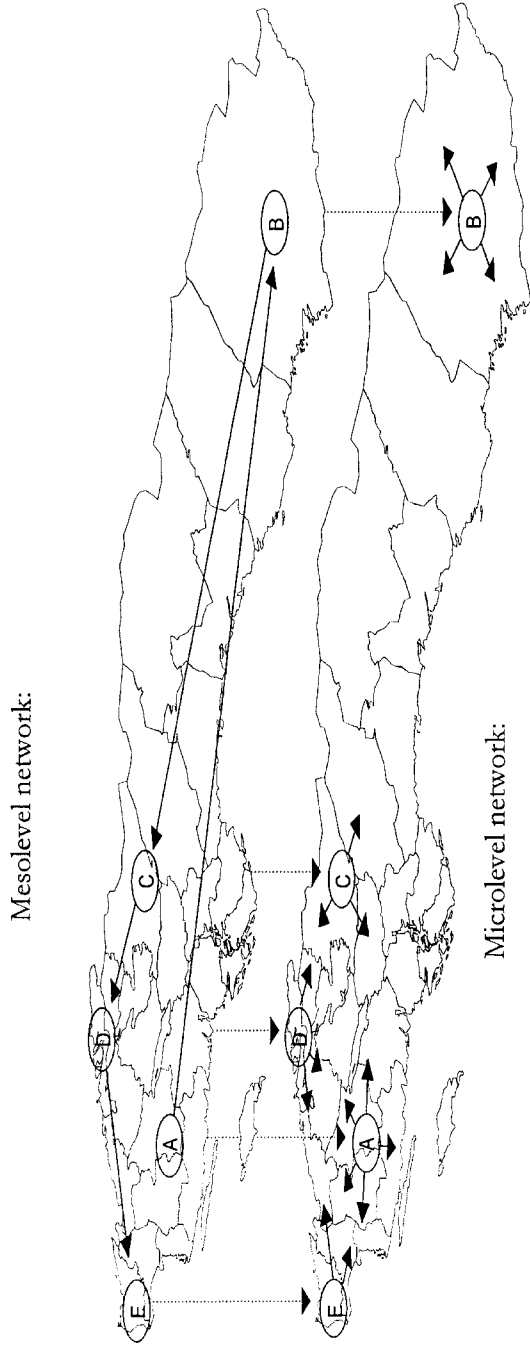


FIG. 1.—Hypothetical micro- and mesolevel networks illustrating the operation of a multilevel diffusion process

likely to have considerably influenced the *path* through which the party diffused across the nation.

These mesolevel edges are important for another and perhaps less obvious reason as well: the edge between *A* and *B* not only reduces the distance between *A* and *B*, it also reduces the distances between the neighbors of *A* and *B* and between the neighbors of the neighbors. Thus the edges of a mesolevel network tend to sharply reduce the average geodesic distance between actors in the system as a whole, which is likely to increase the *speed* of the diffusion process considerably.

### A Computational Model

To demonstrate how important mesolevel networks can be for the type of contagious processes we study here, we will use a computational model.<sup>11</sup> This model analyzes processes similar to those described in figure 1, but we will use a much more fine-grained map of Sweden. During this period, mainland Sweden was divided into 364 jurisdictional districts (*härad*). We will use the adjacency matrix of this district map to represent the microlevel network. A tie is said to exist between two districts if they are neighbors, that is, if they have a border in common. Each district has an average of 5.7 neighbors, and the average geodesic distance of the microlevel matrix is 9.8, which means that individuals from two randomly selected districts must on average use intermediaries in approximately nine other districts in order to reach one another.

We will simulate two different types of mesolevel networks—a “random network” and an “optimal network.” For both of these networks, we assume that an agitator’s first visit takes place in a randomly selected district. For the random network, a pure random process decides which of the nonneighboring districts the agitator visits next. For the optimal network, the agitator is assumed to act intentionally and to visit the district that leads to as large a reduction as possible in the average geodesic distance.<sup>12</sup>

If we add the edges of the mesolevel network to the microlevel network, we arrive at a new network that we will refer to as the “combined network.” The average geodesic distance of the combined network is shown

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tween-arrondissement network considered by Gould (1991) in his analysis of mobilization in the Paris Commune of 1871.

<sup>11</sup> See Hedström and Liljeros (2000) for a detailed description of the computational model.

<sup>12</sup> The “optimal” travel path is based on how it reduces the geodesic distance of the combined micro- and mesolevel network.

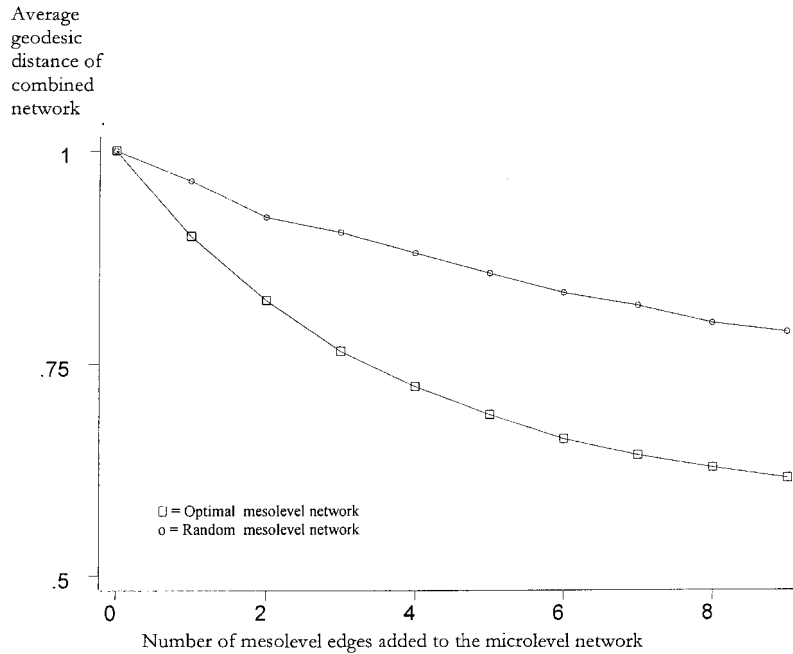


FIG. 2.—Size of the mesolevel network and average geodesic distance of the combined micro- and mesolevel network. Each data point in the graph is an average based on 12 simulation runs.

in figure 2.<sup>13</sup> As this figure clearly demonstrates, adding just a few mesolevel edges dramatically reduces the average distance between actors in different districts. For example, adding a mesolevel network with as few as three “optimal” edges to the 832 edges that exist in the microlevel network reduces the average geodesic distance of the combined network to approximately 75% of its initial value, and adding a mesolevel network with nine such edges reduces the distance to about 60% of its initial value. The effect of the random network is similar but not of the same striking magnitude.

Figure 3 demonstrates the likely consequences of these structural changes for the diffusion process that unfolds within the networks. These simulations are based on the assumption that a party organization is founded in the first district visited by the agitator. The diffusion of party

<sup>13</sup> To improve readability, the vertical axis of fig. 2 has been rescaled by dividing each distance by 9.8, i.e., by the average distance of the microlevel network.

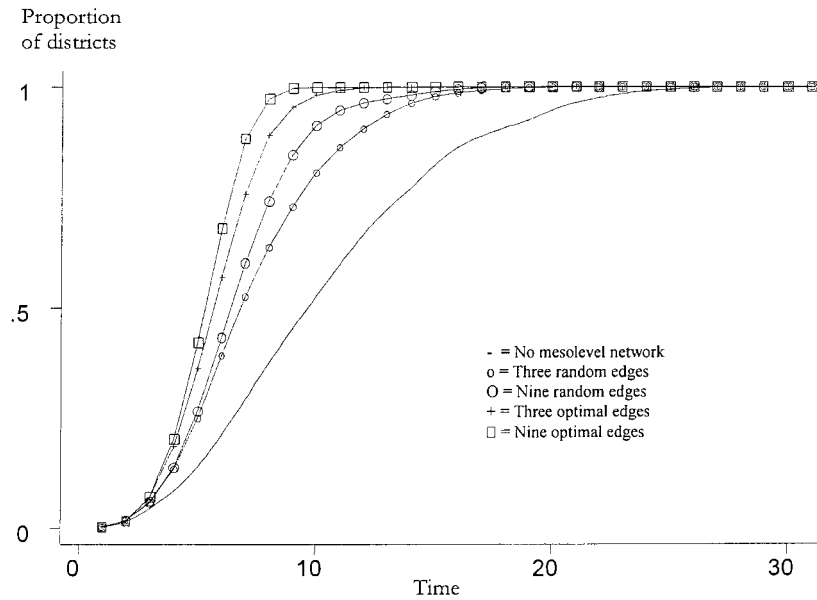


FIG. 3.—Mesolevel networks and the speed of the diffusion process. Each data point in the graph is an average based on 12 simulation runs.

organizations thereafter is channeled through the edges of the micro- and mesolevel networks. If a party organization is established in a district at time  $t$ , we assume that new party organizations are founded at  $t+1$  in all districts that are directly connected to this district that did not already have a party organization.<sup>14</sup>

As can be seen from the rightmost curve in figure 3, if no mesolevel network existed, the party would have spread to half of the districts in approximately 10 time periods and to Sweden as a whole in 26 time periods. The existence of a mesolevel network—random or optimal—dramatically speeds up this process. For example, if a mesolevel network with three optimal edges existed, it would only take 6 time periods for the party to spread to half of the districts, and 13 time periods for it to cover Sweden as a whole.

These analyses show conclusively that if the agitators created these

<sup>14</sup> To assume that party organizations will be founded in all districts directly connected to the focal district is obviously not realistic. However, using lower and more realistic probability values would not change the substantive conclusion about the importance of mesolevel networks; it would only change the time scale in fig. 3.

types of mesolevel networks in the course of their travels, they are likely to have considerably influenced the pattern as well as the speed at which the Social Democratic Party diffused throughout Sweden. For the same reasons as discussed above, however, we should expect that the effect of this network declined with the passage of time since, over the years, more information became available that gradually made the choice situation less ambiguous.

#### DATA AND METHODS

A decisive test of the hypotheses discussed above requires relevant longitudinal data on individuals and information on their relationships to all other individuals in the relevant population at different points in time. Even if this type of data were possible to collect, it is definitely not currently available. Hence, an alternative strategy is necessary. Instead of individual-level data, we will focus on the founding of the first local social democratic organization in different geographical areas. As will be discussed more fully below, this approach allows for a reasonably reliable test of the key hypothesis developed above.

The data set we are using has some unique features. It contains information about practically every local social democratic organization in Sweden between the years 1894 and 1940. We have information about when each organization was founded and how many members it had registered at the end of each year from its founding until 1940 (or until its dissolution, if that occurred before 1940).<sup>15</sup>

The unit of analysis will be the same as in the computational model, that is, a jurisdictional district called "härad." Data on a total of 365 such districts exist.<sup>16</sup> The event to be analyzed is the founding of the first party organization in a district, and we will analyze how the timing of this event was influenced by the way in which the district was embedded in the type of micro- and mesolevel networks described above. For this reason, we will only consider the time period between 1894, when the first local organization was founded, and 1911, when the traditional form of agitation had ceased to exist.

We have collected demographic data describing these districts from the population censuses of 1890, 1900, 1910, and 1920. The size of the industrial labor force for the years in between the census years has been

<sup>15</sup> The Swedish Social Science Data Service at Göteborg University has made the primary data source available to us. The primary researchers who collected the data are Carl-Göran Andræ and Sven Lundkvist.

<sup>16</sup> The reason for the difference between the number of districts included here and in the computational model is that we also include island communities in these analyses.

approximated using linear interpolation. We include this variable because the Social Democratic Party, during this era, appealed almost exclusively to the working class, and therefore it is likely that the size of the industrial labor force influenced the likelihood that a party organization would be founded (see table 1). We have also included a dummy variable indicating whether the district was a town or not, since Lundqvist (1977) has shown that this variable was of some importance. Finally, information about the agitators' activities and travel routes has been collected from the annual yearbooks of the Social Democratic Party, which include detailed reports from the agitators. These books are stored at the central archives of the Swedish labor movement in Stockholm (*Arbetarrörelsens arkiv och bibliotek*).

At the turn of the century, social movement activity was extremely high in Sweden. In addition to the emerging Social Democratic Party, the trade unions, the temperance movement, and the free churches organized large segments of the Swedish population. Previous research indicates that the strength of these other movements influenced the spread of the Social Democratic Party in various ways (see Westerståhl 1945; Lundqvist 1977; Korpi 1978; Brantgårde 1996). The trade unions were closely affiliated with the party itself, while the temperance movement often served as an organizational school for the unorganized working class. The free churches were usually strongly opposed to socialist ideas. In order to control for these potential influences, we have included covariates on membership in these types of organizations.<sup>17</sup>

As suggested by Marsden and Poldony (1990) and Strang (1991), among others, event history methods provide a natural framework for analyzing diffusion processes. We will focus on the time at which the first party organization was founded within a district and examine how the timing of this event was related to covariates describing the districts and the activities taking place in other districts. Since the events to be analyzed are recorded on an annual basis only, a discrete-time event history approach is appropriate. Thus, we will estimate the parameters of the following type of model:

$$\ln\left(\frac{p_{it}}{1-p_{it}}\right) = \alpha_t + \sum \gamma_k x_{ikt-1} + \beta N_{it-1} + \psi M_{it-1} + \lambda A_{it-1}, \quad (1)$$

where  $p_{it}$  equals the hazard rate, or the conditional probability that the first party organization in district  $i$  will be formed at time  $t$ , given that no organization had been formed in the district prior to time  $t$ , and where  $\alpha_t$ ,  $\gamma_k$ ,  $\beta$ ,  $\psi$ , and  $\lambda$  are logistic regression coefficients to be estimated.

<sup>17</sup> This information is based on data from the same source as the data on the Social Democratic Party.

TABLE 1  
DESCRIPTIVE STATISTICS

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Dependent variable	.06	.23	...									
2. Town	.16	.37	.09									
3. ln(industrial labor force) ( $t-1$ )	6.15	.99	.17	-.14								
4. (Union members/1,000) ( $t-1$ )	.02	.07	.23	.03	.29							
5. (Temperance members/1,000) ( $t-1$ )	.37	.47	.14	-.11	.50	.41						
6. (Free-church members/1,000) ( $t-1$ )	.27	.41	.10	-.03	.48	.40	.59					
7. (No. of SAP organizations/100) ( $t-1$ )	.95	.96	.15	-.12	-.03	.13	.15	-.04				
8. (No. of SAP organizations/100) <sup>2</sup> ( $t-1$ )	1.83	3.34	.14	-.10	-.04	.10	.12	-.03	.96			
9. Microlevel network effect ( $t-1$ )	.00	1.00	.12	-.12	.00	.16	.11	-.05	.79	.61		
10. Mesolevel network effect ( $t-1$ )	.00	1.00	.21	-.02	.17	.24	.20	.11	.33	.30	.29	...
11. ln(agitator visits) ( $t-1$ )	.06	.27	.23	-.04	.22	.30	.29	.20	.14	.10	.16	.46



$x_{ikt}$  are the  $k$  district-specific variables likely to have influenced the probability of an organization being formed. The intercept of the equation,  $\alpha_i$ , will be allowed to vary from year to year since it is likely that the propensity to form party organizations also changed independently of changes in these covariates.

One of the hypotheses stated that social democratic activities in other districts would influence the probability of a party organization being formed in the focal district through various interpersonal links—the microlevel network effect. Following the work of Hågerstrand ([1953] 1967), it seems reasonable to assume that the probability of a contact between two workers in different geographical locations declines with the distance between them. Given this assumption, it is possible to test the hypothesized effect of the microlevel network with the following variable:

$$N_{it} = \sum \frac{n_{jt}}{\sqrt{d_{ij}}}, \quad (2)$$

where  $d_{ij}$  is the distance between districts  $i$  and  $j$ ,  $n_{jt}$  is the number of social democratic members in district  $j$  at time  $t$ , and the summation is taken over all districts  $j$  other than  $i$  (see Hedström 1994). “Distance” here refers to the normalized straight-line distance in kilometers between the centroids of the two districts.<sup>18</sup> This  $N$ -variable can be said to measure the social democratic “pressure” exerted on a district by activities taking place in other districts. The closer two districts are to one another, the greater the likelihood that ties will exist between workers in the two districts, and the more likely they are to influence one another (see also Land and Deane 1992). The parameter  $\beta$  in equation (1) is therefore a microlevel network-effects coefficient that indicates how the probability of founding an organization in one district responds to changes in the (weighted) number of party members in other districts. If  $\beta$  is significantly different from zero, a microlevel diffusion process is likely to be operating (see Doreian 1981; Hedström 1994; Marsden and Friedkin 1994).

To test the hypothesis about the effects of the mesolevel network that emerged out of the travel routes of the political agitators, we constructed the following variable:

$$M_{it} = \sum w_{ijt} q_{jt-1}, \quad (3)$$

where  $w_{ijt}$  is a binary variable indicating whether an edge existed between districts  $i$  and  $j$  at time  $t$ ,  $q_{jt-1}$  is another binary variable that takes the

<sup>18</sup> The reason for using the square-root of the distance is simply that it provided a better fit than using the raw distance.

value one if a party organization existed in district  $j$  at time  $t - 1$ , and the summation is taken over all districts  $j$  other than  $i$ . An edge is said to exist between districts  $i$  and  $j$  if an agitator visited district  $j$  at time  $t - 1$  and district  $i$  at time  $t$ .<sup>19</sup>  $M_{it}$  is thus equal to the sum of mobilized districts visited by an agitator during the year prior to the agitator's visit to district  $i$ . Consequently,  $\psi$  in equation (1) is a mesolevel network-effects coefficient, and if it is significantly different from zero, activities in district  $j$  influenced activities in district  $i$  through the mesolink created by the travel routes of the agitators.

In order to test for the effects of the agitators' visits as such, we include an additional variable labeled  $A_{it}$  in equation (1). This variable is equal to the natural logarithm of the total number of agitator visits to a district during year  $t$ . If the coefficient associated with this variable,  $\lambda$ , is greater than zero, the visit of an agitator significantly increased the likelihood that a party organization would be founded.

Before the parameters of the above model are estimated, the units must be changed from districts to "district-years" so that each district contributes as many observations as the number of years that it was at risk (see Allison 1982). For example, a district in which the first organization was formed in 1895 will only contribute one observation, while a district where the first organization was formed in 1899 will contribute five observations. The set of 365 districts contributed a total of 4,566 district-years.

## RESULTS

Figure 4 describes the aggregate pattern of the diffusion process being analyzed here. At the beginning of the period, party organizations had only been established in a few districts. The social democratic movement quickly spread across the nation, however, and already by 1911, party organizations had been established in approximately 70% of the districts.

As mentioned above, we will use an event history framework to assess how various factors are likely to have influenced this diffusion process. We have chosen to report the results of our analyses in terms of five different models:

1. In model 1, we include a set of district-specific covariates that are likely to influence the founding of the first party organization within a district as well as variables measuring the number of social democratic organizations in Sweden as a whole. These latter variables are included

<sup>19</sup> Following the suggestion of Marsden and Friedkin (1994), the influence measure is normalized so that it sums to 1.0. In total, 43 agitators figured in the reports. Of these agitators, only 13 appeared in the reports from at least two successive years and thus were able to contribute to the mesolevel network variable.

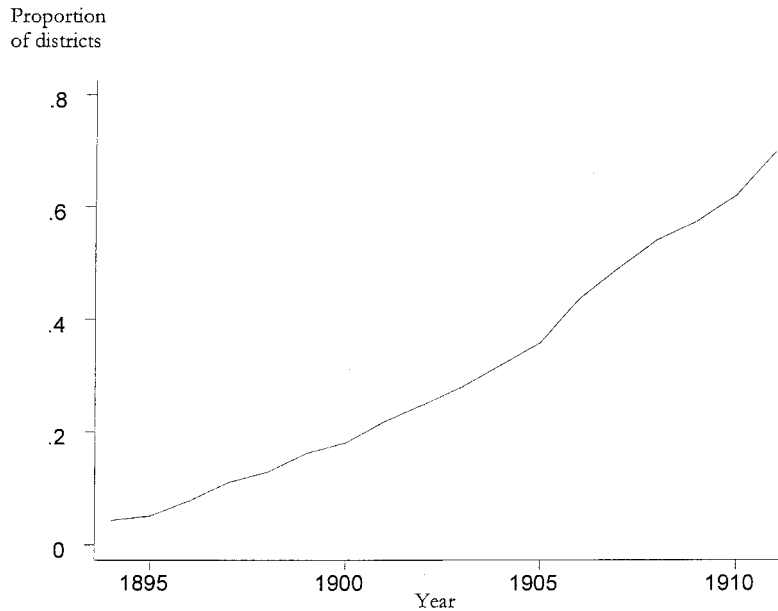


FIG. 4.—Spatial diffusion of the Swedish Social Democratic Party, 1894–1991, aggregate pattern.

in order to test what we consider to be the main alternative explanation for the processes being analyzed here. This explanation has been developed by organizational ecologists and states that the rate at which new organizations are founded is governed by the legitimacy of and competition within the organizational population, and that these entities in turn vary systematically with the number of organizations in the population at large (see Hannan and Carroll 1992)

2. In model 2, we add the microlevel network variable ( $N_{it}$ ).

3. In model 3, we add variables related to the agitators' activities; the mesolevel network variable ( $M_{it}$ ), and the (natural logarithm of) the number of agitator visits in the district during the preceding year ( $A_{it}$ ).

4. In model 4, we test hypotheses about time-related interaction effects. As discussed above, we expect the effects of the network and the agitator-visit variables to decline with the passage of time. If individuals are influenced by the actions of others largely because of the ambiguities of the choice situation, the network effects should diminish as more and better information becomes available.

5. In model 5, we test the hypothesis about interaction effects between the demographic characteristics of the districts and the number of agitator visits. As discussed above, it seems reasonable to expect that the effect of an agitator visit depends upon the social and demographic composition of the district. If the population in a district was largely composed of individuals with a strong prior disposition toward the party, the agitator's success rate is likely to have been high. In the present context, it seems likely that districts with many industrial workers and many union members would have been more predisposed to the message of the agitator.

Included in models 1, 2, 3, and 5, but omitted from the presentation, are time dummies, one for each year. As mentioned above, the purpose of including these dummy variables is to allow for the intercept to vary from year to year and thereby to control for time-related unobserved heterogeneity and period effects.

In the first model in table 2, we relate the founding of the first party organization within a district to the demographic characteristics of the district and to the density of the organizational population. We follow the established practice of including variables measuring both the total number of organizations in the population as a whole and the square of this variable to test the ecological hypothesis that party founding is primarily the result of a population-level process rather than a network-based diffusion process (see Hannan and Carroll 1992). As can be seen from the first column of table 2, these density variables have the signs that one would expect on the basis of ecological theory. However, only the linear main effect is statistically significant in this model. Furthermore, once we include the network variables (see models 2–5), these density variables either do not have any effects at all or the direction of the effects are opposite to those predicted by ecological theory. Ecological theory thus does not seem to be particularly well suited for explaining this process—a fact that is quite understandable given the short time period being examined here.

In the second model, we include the microlevel network variable. It relates the founding of the first organization within a district to party activities in other districts, and it assumes that this influence is channeled through the microlevel network. As the results indicate, there is some evidence supporting the hypothesized effect of the microlevel network. The coefficient has the expected positive sign, but the strength of the support is rather weak since the estimate is only of borderline significance.

In model 3, we include the mesolevel network variable and the agitator-visit variable. The coefficients of both of these variables are statistically significant, and they have the expected positive signs. This suggests (1)

that the agitators were effective in their mission,<sup>20</sup> and (2) it suggests that a multilevel diffusion process was indeed operating.<sup>21</sup> Thus, not only were the agitators effective in themselves, they also seem to have carried information between distant parts of the country that influenced the likelihood that a party organization would be founded.<sup>22</sup>

Moreover, a comparison of model 2 and model 3 shows that we would have seriously underestimated the effect of the microlevel network had we not included information about the mesolevel network and the agitator visits. The regression coefficient associated with the microlevel network variable increased by more than 80% once we controlled for the joint effect of the two agitator-related variables, and it is now highly significant. Comparing the log-likelihood statistics of model 2 and model 3 also shows that model fit improved considerably when we included the mesolevel network variable and the agitator-visit variable.

In model 4, we examine how the effects of the network variables changed over time. In order to do this, we excluded the time dummies and included time, time square, and the interaction of these time variables with the network and the agitator-visit variables. It should be emphasized that the time dummies in model 3 did *not* suggest that the propensity for a party organization to be formed changed smoothly over time. Hence,

<sup>20</sup> We have also examined whether some agitators were more effective than others were by using separate dummy variables for each agitator. Although some differences could be noted—A. Palm and J. Persson were slightly more effective than the others—the magnitude of these differences was negligible, and therefore we decided to treat the agitators as a collectivity when estimating the effects of their visits. The effects of the network variables remained more or less the same irrespective of which type of agitator variable we used.

<sup>21</sup> Given the way in which these network variables are constructed, it is conceivable that the observed network effects mainly reflect the total number of social democratic members in the country as a whole and that the two network dimensions are of little or no importance. In order to examine whether this was the case, we also estimated a model that included an additional covariate, namely the total number of social democratic members in Sweden during the preceding year. This variable did not have any significant effect, however, and both network variables continued to have unique significant effects, thus underscoring the importance of the multilayered network process. Another possible source of bias would arise if the agitators chose their routes so as to visit districts they believed were easy to organize. However, there is nothing in the historical records suggesting this was the case. The agitators rather concentrated their efforts in districts that were known to be difficult to mobilize, such as the farm districts and the industrial estates in the Bergslagen region (see Mral 1996; Hirdman 1988).

<sup>22</sup> It should be emphasized that this analysis does not directly estimate the overall effect of the mesolevel network on the diffusion process. What it does is to examine whether the links in the mesolevel network operated as expected. This result suggests that they did, and by implication, this means that the mesolevel network is likely to have been important not only for the path through which the Social Democratic Party diffused throughout Sweden, but also for the speed of the process.

TABLE 2  
 ESTIMATES OF LOGIT MODELS PREDICTING THE FOUNDING OF SOCIAL DEMOCRATIC PARTY ORGANIZATIONS IN  
 JURISDICTIONAL DISTRICTS, 1894-1911

Variable	(1)	(2)	(3)	(4)	(5)
Constant	-10.638 (-9.466)	-10.175 (-8.736)	-9.140 (-8.315)	-7.954 (-6.042)	-9.172 (-8.560)
Town	1.733 (9.639)	1.775 (9.786)	1.794 (10.214)	1.794 (9.765)	1.765 (9.651)
ln(industrial labor force) <sub>(t-1)</sub>	1.051 (6.120)	1.053 (6.155)	.979 (6.095)	.974 (5.928)	.970 (6.268)
(Union members/1,000) <sub>(t-1)</sub>	2.797 (2.499)	2.699 (2.386)	2.096 (2.013)	2.230 (2.339)	3.915 (4.706)
(Temperance members/1,000) <sub>(t-1)</sub>	-1.195 (-9.943)	-1.144 (-6.665)	-1.185 (-8.67)	-2.220 (-1.087)	-0.065 (-3.66)
(Free-church members/1000) <sub>(t-1)</sub>	-3.07 (-1.520)	-3.08 (-1.537)	-3.40 (-1.713)	-2.91 (-1.499)	-3.44 (-1.590)
(No. of SAP organizations/100) <sub>(t-1)</sub>	.794 (2.186)	-2.98 (-3.92)	-1.643 (-2.116)	-2.795 (-2.484)	-1.742 (-2.213)
(No. of SAP organizations/100) <sub>(t-1)</sub> <sup>2</sup>	-0.009 (-.096)	.237 (1.341)	.534 (2.964)	.431 (1.455)	.560 (3.061)
Microlevel network <sub>(t-1)</sub>		.388 (1.715)	.708 (3.107)	.677 (2.620)	.714 (3.077)
Mesolevel network <sub>(t-1)</sub>			.175 (2.746)	.218 (2.710)	.131 (2.031)
ln(no. of agitator visits) <sub>(t-1)</sub>			.646 (2.947)	.935 (3.330)	5.193 (3.123)
Time				.309 (3.813)	



the analyses reported in model 4 should be treated somewhat cautiously; they should be seen as a rough test for the existence of interaction effects. However, taken at face value, the results give considerable support for our hypotheses. The effect of both the microlevel network and the agitator visits decreased monotonically with the passage of time. This is exactly the pattern one would expect to find if the effects of these variables were due to ambiguities of the choice situation. The effect of the mesolevel network does not behave exactly as expected, however; these results suggest that the effect of the mesolevel network first increased for a few years before it started decreasing. It is obviously difficult to speculate about possible reasons for this pattern; it may simply be due to our using an inappropriate time variable in this model. However, one could speculate that the agitators simply did not have many “success stories” to relate during the first few years of our study, and therefore the links of the mesolevel network were not particularly influential during that initial time period.

In the fifth and final model, we examine the interaction effects between the social and demographic characteristics of the districts and the agitator-visit variable. As mentioned above, we had expected to find positive interaction effects, but the effects in model 5 are clearly negative. A visit by an agitator mattered more for the likelihood that a party organization would be founded in a district with few workers and union members—a result that in hindsight seems just as likely as the one we expected to find. This result seems to suggest that two important mobilization routes existed: one through the unions and one through the agitators.

The effects of the other variables remain fairly stable across the models. The likelihood that a party organization would be formed was higher in cities, in districts with a large industrial sector, and in districts with many union members. The free churches appear to have had a damping effect on the spread of the Social Democratic Party, while the net effect of the temperance movement was negligible.<sup>23</sup>

#### SUMMARY AND CONCLUDING REMARKS

An actor deciding whether or not to start a new type of social movement organization usually faces a highly ambiguous choice situation. Particularly before a social movement has become firmly established in the political arena, the likely effects of starting a new movement organization

<sup>23</sup> It should also be mentioned that we have tested for the presence of spatial autocorrelation. We correlated the difference in the Pearson residuals in each pair of districts with the distance between the districts. The correlation was less than  $-.005$ , which suggests that spatial autocorrelation is not a concern here.



are nearly impossible to predict. In such situations, important information about the likely consequences of founding an organization is provided by prior decisions of other actors, and information about these decisions flows through social networks of varying density and reach. In this article, we have focused on two types of mechanisms—imitation and persuasion—and on two types of actors—workers and agitators. The combination of these mechanisms and actors suggested the importance of two types of networks—a microlevel network, directly linking nearby workers to one another, and an agitator-mediated mesolevel network, linking workers in distant districts to one another.

We used a simulation model to demonstrate the potential importance of the mesolevel network for the diffusion of the Social Democratic Party. The analysis suggested that the mesolevel network had a considerable influence on both the pattern and the speed at which the Social Democratic Party diffused through Sweden. These theoretical expectations were supported by the results from the empirical analyses that strongly suggested that the spread of the Swedish Social Democratic Party was due to a combination of two network processes operating at different analytical levels. In fact, our empirical analysis indicates that we would have seriously underestimated the importance of the microlevel diffusion process had we not included the information about the mesolevel network resulting from the agitators' travels across Sweden.

In addition to underscoring the potential importance of mesolevel networks for the diffusion of contagious social practices, the simulation results cast some doubt on the central importance that has sometimes been attributed to network density for understanding diffusion processes. In the particular example discussed in the main body of the paper, the addition of three mesolevel edges had a dramatic effect on the diffusion process, but the density of the combined network changed only marginally (from .01259 to .01264). More subtle measures than network density thus appear to be needed in order to understand how a specific structural configuration is likely to influence a social process.

Our results also cast some doubt on the thesis of some Swedish labor historians (e.g., Åmark 1986) that the agitators only played a minor role in the spread of the Swedish labor movement. Contrary to their assertions, the effects of the mesolevel network and the agitator visits suggest that the agitators were of crucial importance for the growth and spread of the Social Democratic Party.

The multilevel network approach used in this article is important for the analysis of contagious processes in general. Even an extremely sparse mesolevel network can dramatically influence a diffusion process, and for this very reason, they are of fundamental importance. Without simultaneously considering contagious processes that operate at different ana-

lytical levels, it will be difficult and perhaps even impossible to fully grasp the complex relationships that exist between social structures and social processes.

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