

The Micro-Macro Link

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Microfoundations and Macrosocial Behavior

James S. Coleman

Much of social theory involves accounting for the functioning of some kind of social system. In most sociological research, however, observations focus not on the system as a whole but on some part of it. In fact, the most natural unit of observation is the individual; and in the development of quantitative methods of research dependence on individual-level data, most often in the form of interviews, sometimes in the form of administrative records of behavior, and sometimes in still other forms, has increased greatly. This has led to a widening gap within the discipline between theory and research: Social theory continues to be concerned with the functioning of social systems of behavior, whereas empirical research—particularly quantitative research—is largely concerned with explaining individual behavior.

This focus on individual behavior as the phenomenon to be explained is not completely misplaced in sociology, nor is it new. For example, in one of the sociological classics, *Suicide*, first published in 1897 (1951), Durkheim attempted to explain suicide rates in different societies and among different population groups within a society. Although he described the suicide rate as a *social fact* and was engaged in a polemic against social psychology, Durkheim was engaged in explanation of individual behavior. The only aspect of this work that made it social was that the explanatory variables Durkheim used were explicitly social: the absence of strong social norms, which he termed the degree of anomic in society, or the degree of social isolation among individuals.

However, given that much of social theory is concerned not with in-

dividual behavior but with the functioning of social systems of behavior, and given that the most common and most natural observations are of individuals, a central intellectual problem in the discipline is the movement from the individual level, where observations are made, to the systemic level, where the problem of interest lies. This has been called the "micro-to-macro problem," and it is a problem that is pervasive in the social sciences generally. In economics there is microeconomic theory and macroeconomic theory; and one of the central deficiencies in economic theory is the weakness of the linkage between them, a weakness papered over with the idea of "aggregation" and with a ubiquitous concept in macroeconomic theory, the "representative agent."

What I propose to do in this essay is to show some of the problems involved in making a proper micro-to-macro transition, to point to some instances in which the transition has been made, and to indicate steps toward doing so in some areas where it has not been done successfully. In the process I will discuss Protestantism and the rise of capitalism, theories of revolution, economic markets, marriage markets, labor force problems and job markets, panics, and collective decisions.

To explore what is involved in making a proper transition from micro to macro, I will turn first to an instance in which it was not done properly. The example is another classic in sociology, Max Weber's *The Protestant Ethic and the Spirit of Capitalism* (1958). At one level of detail Weber is simply expressing a macrosocial proposition: The religious ethic that characterized those societies that became Protestant during the Reformation (and particularly those that were Calvinistic) contained values that facilitated the growth of capitalist economic organization.

At a finer level of detail Weber's single proposition breaks into three: one having an independent variable characterizing the society, with the dependent variable characterizing the individual; a second with both independent and dependent variables characterizing the individual; and a third with the independent variable characterizing the individual and the dependent variable characterizing the society. Thus the proposition system begins and ends at macro levels, but in between it dips down to the level of individual. The propositions may be put, somewhat crudely, as follows:

1. Protestant religious doctrine generates certain values in its adherents.
2. Individuals with certain values (referred to in item 1) adopt certain kinds of orientations toward economic behavior.

3. Certain orientations toward economic behavior (referred to in item 2) on the part of individuals help bring about capitalist economic organization in a society. (The central orientation to economic behavior is characterized by Weber as "antitraditionalism.")

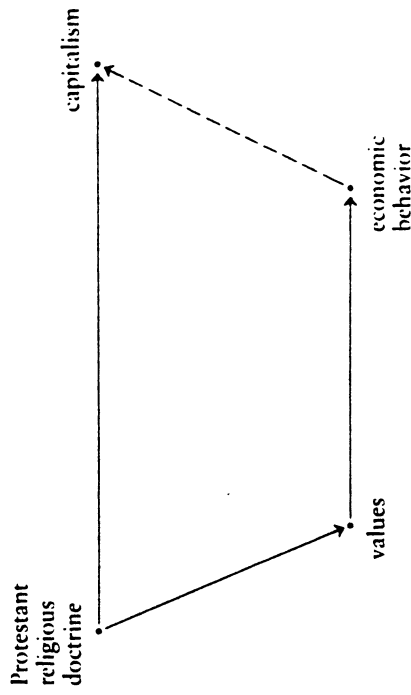


FIG. 6.1

Figure 6.1 shows a way of diagramming such multilevel systems of propositions. The upper horizontal arrow represents the macro-level proposition. The three connected arrows beginning at the same point going down to a lower level and back up to the final point represent the three linked propositions labeled 1, 2, and 3.

In this set of propositions the third is of most interest, for it is the third which moves back up from the individual level to the societal level. Thus in contrast to Durkheim's work on suicide, in which the phenomenon of ultimate interest could be described as individual behavior, here the phenomenon of ultimate interest is clearly macrosocial, characterizing the society as a whole. It is in the third proposition that Weber's theory is weakest, however, for it is here that some combination of individual actions is necessary to generate a macrosocial outcome. The orientations toward action of a worker in a capitalist enterprise are not the same as those of an entrepreneur, yet both are necessary to the enterprise. The orientations necessary to begin such enterprise are not the same as those necessary to continue it. In short, capitalist economic organization is a system of action, and to show how that system comes into being, or even how it functions once in being, the aggregate value orientation of the population is not sufficient.

Some would defend Weber on the grounds that he was not attempting

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to account for the rise of capitalism but only the "spirit" of capitalism. This, I believe, is a rather weak defense, for if Weber were attempting merely to account for the spirit of capitalism, then is that to be regarded as a property of the society (that is, a shared norm) or as a constellation of beliefs on the part of the individual Protestant? If the former, Weber failed to show the processes through which individuals' beliefs give rise to the social norm (as well as to demonstrate the relevance of such a norm to the actual practice of capitalism). If the latter, one must ask exactly what Weber's accomplishment is, since under this interpretation he has shown only that a set of beliefs in the religious realm is consistent with a set of beliefs in the economic realm.

A more contemporary instance of the attempt to make the micro-to-macro transition through simple aggregation of individual attitudes or orientations can be found in certain theories of revolution. These are theories that can generally be termed "frustration theories." The problem taken by frustration theorists of revolution is the puzzling one of why revolutions often seem to occur during periods of social change in which conditions are generally improving. Frustration theorists resolve this problem by arguing that the improving conditions in the society create frustration on the part of individual members of the society, leading to revolution. Like Weber's propositions in the Protestant ethic, there are three linked relations. The first is from the system level to the individual level; the second is wholly at the individual level; and the third is from the individual level to the system level. Figure 6.2 shows these propositions diagrammatically.

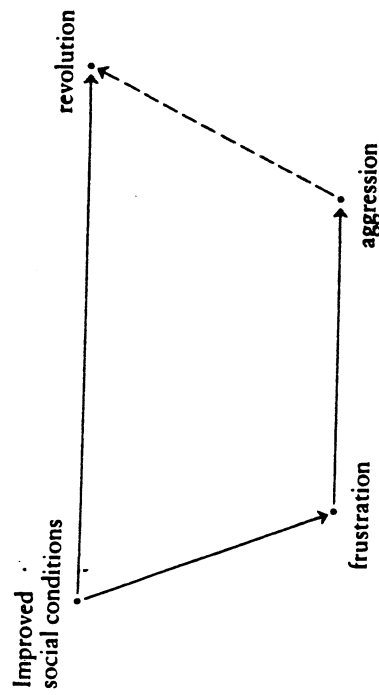


FIG. 6.2

The first relation takes several forms, depending on the source of frustration as viewed by the theorist: "short-term setback" in the theory of

James Davies (1962); "relative deprivation" in the work of Ted Gurr (1970); rising expectations induced by rapid change in the work of others. The second relation is merely a frustration-aggression proposition from psychology. The third relation is implicit: a simple aggregation of individual aggression somehow to magically produce a social product (that is, revolution). Yet this bypasses important social processes: A revolution involves organization and the interplay of actions on the part of a number of actors.

In both instances the micro-to-macro transition is made simply by aggregation of individual orientations, attitudes, or beliefs. If the theoretical problem is, however, a problem involving the functioning of a social system, as it is in the case of explaining the rise of a capitalist economy, or in explaining the occurrence of a revolution, then it should be obvious that the appropriate transition cannot involve the simple aggregation of individual behavior.

WHAT IS AN APPROPRIATE TRANSITION FROM MICRO TO MACRO?

If the two foregoing examples illustrate failures to make the transition from micro level to macro level, then what can be said about successful transitions? A first observation is that good social history makes the transition successfully. Good social history, attempting to establish a causal connection between, for example, the advent of Calvinist religious doctrine and the rise of a capitalist economy in the West, shows not only how the doctrine affects the behavior of individuals but how that behavior then comes to be combined, how the social organization takes place which constitutes capitalist enterprise. After reading such history the reader would be left in no doubt about the character of the argument—about whether a change in workers' behavior, an increase in entrepreneurial behavior, more diligent behavior on the part of managers, or all of these were claimed to be the result of Protestantism and to lead to the growth of capitalism.

It is one thing, however, to be able to trace the development of social organization in a particular instance and quite another to develop generalizations about such processes. It is still another to construct models of the micro-to-macro process. Clearly some form of interdependence must be modeled in cases such as those just described, for the phenomenon to be explained involves social organization, not merely aggregated individual behavior.

The most successful example of modeling this transition is the model

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of a perfect market in neoclassical economic theory. The starting point is a set of individuals, each possessing a particular utility function, a particular set of goods, and a behavior principle that states that a person will act so as to maximize utility subject to the initial resources with which he or she begins. The ending point is a general equilibrium: a set of prices for goods and an equilibrium distribution of goods among the actors. This achievement was, I believe, an extraordinary intellectual feat. The feat was accomplished for an idealized social system, one in which actors were independent, goods being exchanged were private, and tastes were fixed. Close inspection of this theory can give some indication of the extent of the social assumptions. There are, it is assumed, no social barriers to inhibit information flow and exchange agreements; there is complete intermixing among a large set of independent actors; there are no consumption externalities (that is, no social interdependencies in consumption); the goods exchanged are alienable and not inherently attached to the person, as is true for labor services.

There is another difficulty to this accomplishment as well: It has somewhat the character of an existence proof in mathematics. It specifies that with appropriate properties for the utility functions there will be equilibrium; but it cannot be directly applied to particular situations to make the micro-to-macro transition. Nevertheless, it provides a general intellectual framework for making the transition, a model to shape the way we conceive of this transition.

The question then arises as to whether some modification can allow the transition to be made in areas of social science other than economics. The answer, I believe, is yes. I have been working on the development of such models for some time, using the perfect market model with modifications. In this I have employed the strategy of assuming a specific form of the utility function, which allows empirical use of the model with quantitative data. Various applications of this model have been made: to community decision making, resource exchange among interest groups, so-called influence processes in a social network, and others. One arena to which application can be made, and in which some work has been done, is the so-called marriage market. There is a demographic phenomenon known as the "marriage squeeze," which occurs in this way: When there is a sharp increase in the marriage rate, as there was after World War II, a problem exists for the cohorts of females born about the time of the increase or shortly thereafter. There are not enough men for them to marry. Men marry women who are, on average, two years younger than themselves. This means that the normal mates for females born in

1946 would be males born in or around 1944. The 1946 cohort was large, however, and the 1944 cohort was small. Thus there is a marriage squeeze for women; a larger number never marry, and a larger number marry younger men or much older men who are divorced or widowed. Something like the reverse is true if there is a sudden drop in the birth rate: a marriage squeeze for men.

The problem lies in the fact that given this squeeze produced by a sudden birth rate change, it is not at all clear what will "give"—how the scarce men will be distributed among the surplus of women. The absence of a model for assortative mating by age when there are cohort size fluctuations means that demographers have been stymied in their goal of developing what is called a two-sex population model for moving a population forward through generations.

It is clear that marriage can be seen as taking place in a kind of market but one that is quite special, with each actor having only one commodity—himself or herself—to barter and with exchange rates governed by the constraint of one-to-one rather than by exchange at equal value. Models for such matching marriage markets have been developed—for example, by Gale and Shapley (1962), Becker (1974), Sanderson (1980), and Schoen (1983). Theorems have been proved about the stability of particular matching algorithms (Roth 1983). Thus solutions for the marriage squeeze problem of demographers have been attempted that would facilitate a two-sex population model, but this is only a beginning. It is necessary to formulate a model that when supplied with age-by-age marriage rates over a sufficient number of years with varying cohort sizes will give estimates of the utilities of men and women of particular ages for women and men of particular ages, and the structure of the process through which marriages take place.¹ This in turn would lead to predictions about marriage rates when birth rates are known.

This is a case in which the model of the market process provides the appropriate device for moving from the micro to the macro level. It does so in effect by solving simultaneously a set of individual maximizations, which results in a macro-level outcome that is internally consistent. Put in the same diagrammatic form as figures 6.1 and 6.2, this is shown crudely in figure 6.3.

An illustration that shows the feasibility of micro-to-macro models in the area of matching markets is the procedure by which graduates of medical school are matched with hospitals for residency training. Hospitals submit lists of first choices, second choices, and so on, for their residency positions, and applicants submit their choices of hospitals,

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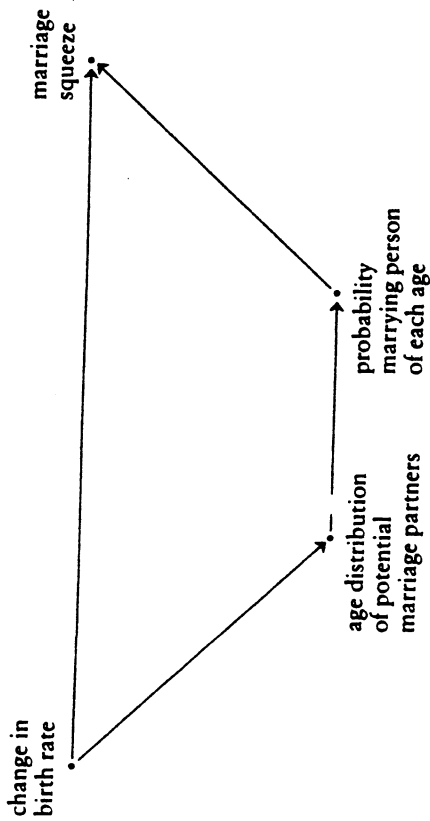


FIG. 6.3

rank-ordered. A computer algorithm, in use since 1957, matches hospitals and applicants. The algorithm constitutes a matching process and a stability theorem for this process has been proved showing that assuming no changes in preference orders, no resident and hospital that are not matched would both prefer each other to the hospital and resident, respectively, with which they are matched (see Roth 1983).

This example illustrates another point as well. Before the matching algorithm was introduced, matches occurred through bilateral agreements in a market that was in continual turmoil. The algorithm introduced an *institution* that imposed a particular structure on the system. A model of the market before this institution would necessarily be somewhat different from the model of the market after the institution came into being. Thus the micro-to-macro model not only begins with numbers of applicants and places and with preference orders for each actor; it also contains, implicitly or explicitly, a model of the institution, process, or structure through which the matches take place.²

COLLECTIVE BEHAVIOR

The preceding example may suggest that any model for the micro-to-macro transition that begins with rational actors at the micro level must take the form of an exchange market. This is not the case, as the following example illustrates.

Some attempts have been made to explain the occurrence of a panic, often leading to injury and death, when a fire alarm is sounded in a

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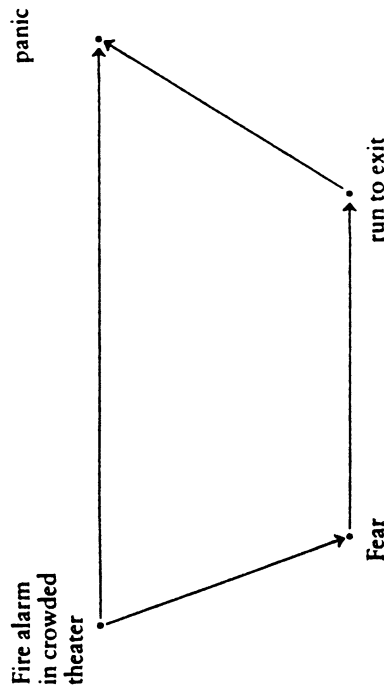


FIG. 6.4

crowded public place. The macro-level relation is the effect of sounding a fire alarm in a crowded building in producing the crowd behavior known as panic. Earlier attempts at explaining this dipped down to the micro level in the following way: The fire alarm created in each person a sense of panic or fear of being trapped. This leads to running toward an exit, which, simultaneous with others' running, leads to jamming and blocking of the exits. The propositions are shown in figure 6.4.

A different explanation was subsequently posed by Mintz (1941) and Brown (1965). Brown showed that the fire alarm created for each person a prisoner's dilemma situation in which purely rational behavior would lead to running: If others were orderly, one was better off dashing toward an exit, whereas if others were not orderly but dashed toward an exit, one was also better off dashing toward an exit than staying behind. Figure 6.5 shows the set of propositions involved.

This explanation has the virtue of accounting for the phenomenon without assuming any form of irrationality, as was necessary in the first explanation, although the micro-to-macro transition is properly carried out in both models. It is deficient, however, in explaining too much. It accounts for the existence of panics and jams but fails to predict the many cases in which no panic occurs and in which persons exit in an orderly fashion. A modification of the explanation is this: In contrast to the prisoner's dilemma situation, there is communication in the crowded theater among those inside. Thus each person has an additional option besides running madly or walking in an orderly fashion: This is to transfer partial control over this action to others, running if they run but walking if they walk. Under what conditions will an individual do so

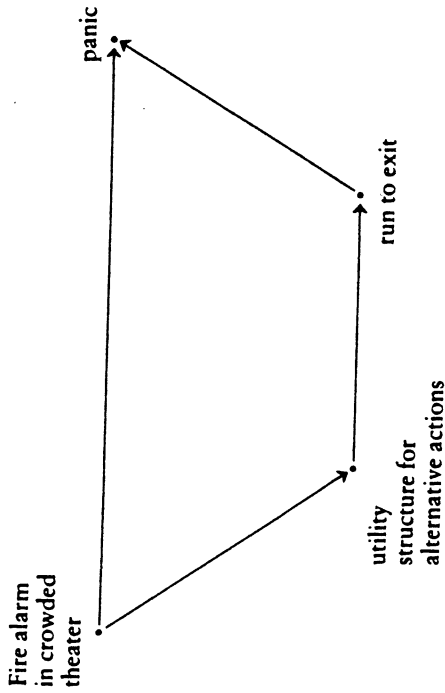


FIG. 6.5

rather than to run unilaterally, as the prisoner's dilemma would dictate? It can be shown (Coleman 1981) that it is rational for one to do so if and only if others have transferred to oneself partial control over their actions. Figure 6.6 shows this modified set of propositions.

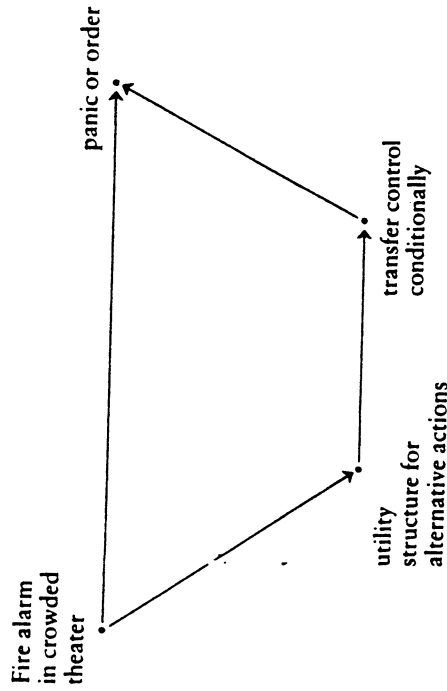


FIG. 6.6

This modification allows a considerably richer set of predictions. First, it does not predict that panic will always occur. Second, it predicts that certain persons, particularly those who are at the center of attention (such as actors on the stage when the alarm is sounded), will be less likely

to run than others, and most likely to run will be those who are likely to be unobserved by others.

As this example illustrates, macro-level phenomena—a panic in this case—can be generated by rational actions that involve no exchange whatsoever. In the model based on the prisoner's dilemma, the individual will take an action unilaterally; that is, dashing toward an exit. In the elaboration of this, under certain conditions, the individual may take another action unilaterally instead: to unilaterally transfer to others in the theater control over the decision to run or to walk.

Such unilateral transfer of control over one's actions, a transfer made rationally, may occur in a wide range of situations quite different from panic. It is the operational description of what we do when we place trust in another person or persons. The widespread role of trust in society, and even systems of trust, indicate that this kind of rational action (which may, as in the panic model, be taken conditionally on certain actions of others) may be important in a number of micro-to-macro transitions, just as exchange in a market context is important in a number of others.

STRATIFICATION RESEARCH IN SOCIOLOGY

It is useful to turn to a body of research that is central to sociology in order to ask how the micro-to-macro transition might be made properly. The body of research is in "social stratification" or "status attainment," and it almost completely fails to make the micro-to-macro transition. Ordinarily research in social stratification treats a change of job as if it were an individual decision: The determinants are background characteristics of the individual, aspects of life history that affect occupational mobility. The destination occupation is regarded as unlimited in number of open jobs; taking a new job of a particular type is analyzed in exactly the same manner as the change of an attitude. Jobs are scarce commodities, however, and a new job is obtained only in competition with others. Or, to put it differently, taking a new job involves *two* mutually contingent decisions: a decision of the job seeker and a decision of the organization in which the job is located. Both decisions are made in the presence of other competing jobs or job seekers.

In short, as in marriage it is a matching process, carried out in a market structure. As in any such matching process, the final action depends not merely on the job seeker's interest in this job but also on the job-seeker's interest in other available jobs; and not merely upon the organization's interest in this job seeker but also on its interest in other available job

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seekers. In addition, these actions depend on the interest of other organizations in this and other job seekers, and in other job seekers' interests and directly on the distribution of other job seekers and of other jobs and of the distribution of interest at each point in these distributions. Thus only if the research problem remains at an individual level (What should one do to improve occupational position, assuming everyone else remained as at present?) can this interdependent structure of the labor market be ignored.

In general, the use of sample surveys to study social stratification makes it necessary to ignore the interdependence. There has been, however, an evolution in the use of sample surveys which brings them closer to macrosocial problems. One stage of this evolution is the use of a well-defined social unit, such as the American adult population. By this single change the work becomes potentially relevant to macrosocial outcomes, for the sample now characterizes a social unit about which statements might be made. A milestone marking this evolutionary stage is Blau and Duncan's *The American Occupational Structure* (1967).

The uncompleted nature of the evolution, however, is evidenced by the fact that the relations studied by Blau and Duncan—and by others working in this tradition—remain wholly at the individual level. The nationally representative sample allows descriptive characterization of the occupational distributions and movements but cannot provide parameters for a model of the labor market process, because individuals' movements are treated as wholly independent. Figure 6.7 shows the individual-level character of the proposition.

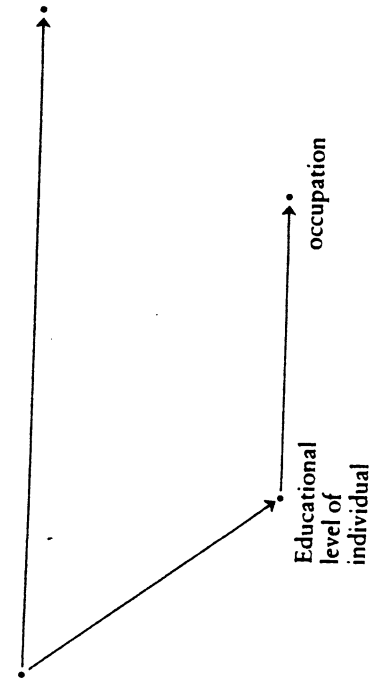


FIG. 6.7

When changes occur in the occupational structure, every effort is made in research of this kind to separate out any influence of the change in occupational distribution, so that "pure" occupational mobility of the individual, uninfluenced by structural changes, can be isolated. It may be that this attention to individual life chances derives in part from the ideological background of the discipline, focusing it on questions such as the amount of status or occupational inheritance that exists over generations, a question that can be answered by remaining at the individual level. Or it may be that this attention is focused by the fact that the research is based on a sample of individuals drawn randomly.

The next evolutionary stage is marked by the book *Inequality*, by Jencks and his colleagues (1972). In that book the authors focused on an explicitly macrosocial question: Does the level of education in society affect the inequality of income? This, in contrast to Blau and Duncan and others following that tradition, asked a macrosocial question and by doing so attracted far wider attention, beyond the committed members of the discipline. What is curious about this work, however, is that the empirical analysis carried out focused completely on an individual-level question. Based on data from a national sample, Jencks and associates asked, Does schooling lead to higher achievement? Based on other surveys, they asked, Does more education lead to higher income? The answers to these questions, whatever they may be, do not provide an answer to the macrosocial question. This can be seen in figure 6.8; it is the lower horizontal proposition to which nearly all the research in this book was directed.

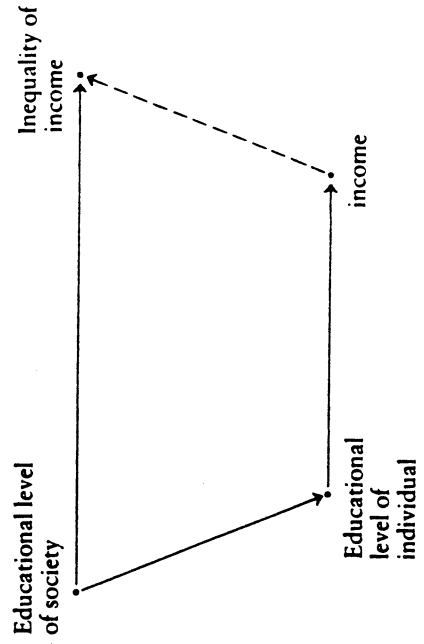


FIG. 6.8

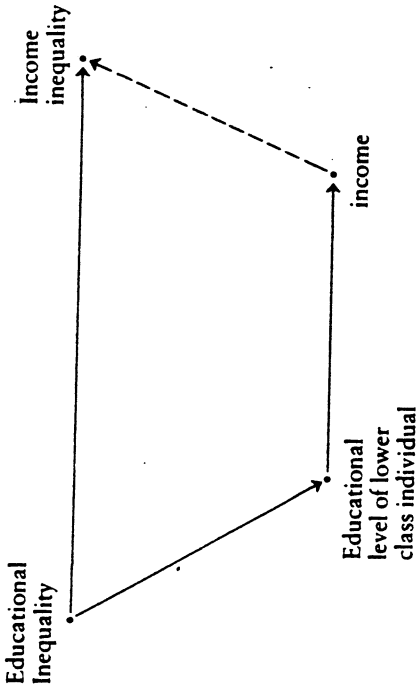


FIG. 6.9

Now suppose the independent variable in the macrosocial question were put in somewhat greater correspondence to the dependent variable. Suppose Jencks and colleagues really meant to ask, Does the *inequality* of education affect equality of income, as shown in figure 6.9? Suppose Jencks had found from the individual-level analysis that an individual's level of education strongly affects that individual's income. Would this have provided an answer to the macro-level question? Again, it would not, because of the absence of an appropriate micro-to-macro transition, which would show how a change in the *distribution* of persons with different levels of education leads to a change in the distribution of income and the quantity of income.

The matter may be seen better by examining the assumptions underlying job training legislation designed to decrease the unemployment of black youth. The assumption is that a macrosocial relation holds: Legislation to provide job training for black youth, among whom unemployment is greatest, will decrease overall unemployment. The research designed to evaluate the program's effectiveness ordinarily studies the micro-level question: Does enrollment in the job training program increase an individual's probability of being employed? Again, suppose the answer is yes. Then this may happen in any of three ways, only one of which has implications for the unemployment level (see Fig. 6.10):

1. The employment of a program-trained youth may come through displacing another black youth who was not enrolled. This would leave the black youth employment rate unchanged.

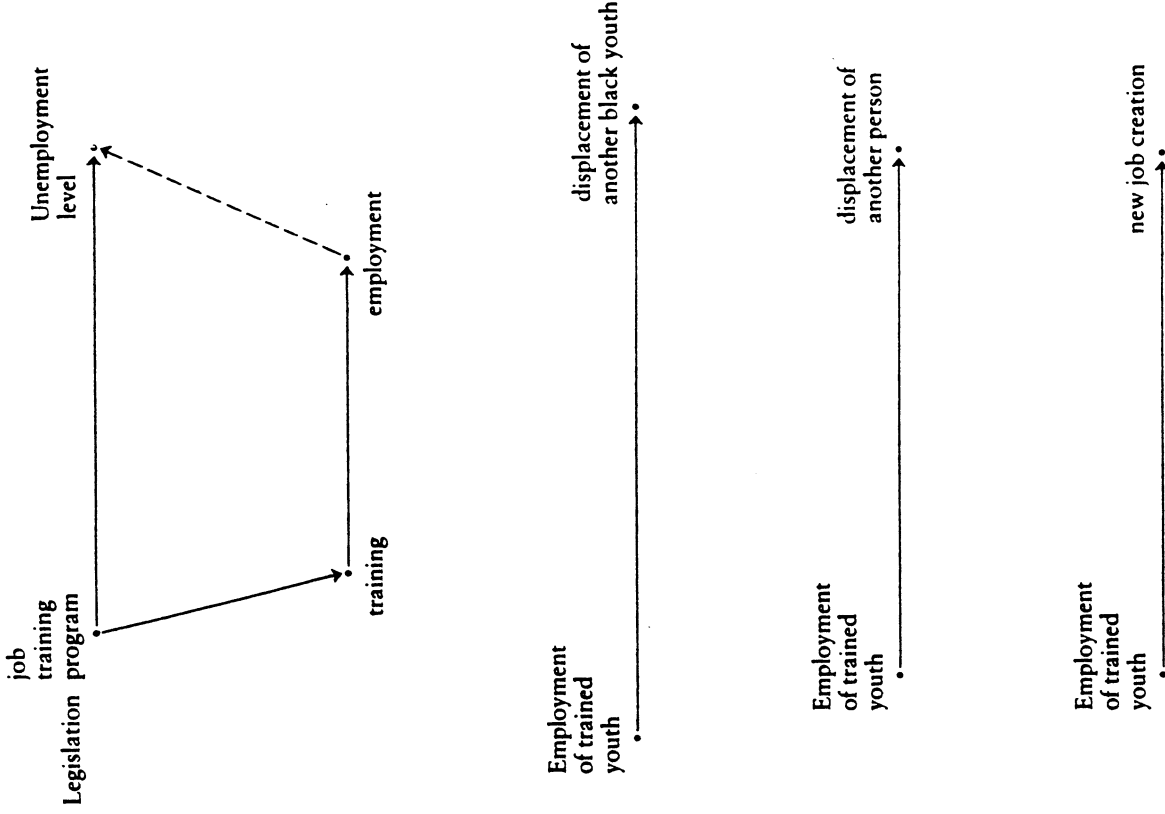


FIG. 6.10

2. Employment may come through displacing another person, not a black youth. This would change the unemployment rate of black youth but would leave the overall unemployment rate unchanged.
3. Employment may occur without displacing anyone, with a new job created that makes use of the newly created human capital.

Only if this third alternative were in fact the one that occurred would the macrosocial relation hold. The question of which of these three alternatives occurs, however, involves additional research beyond the question of whether an individual's training increases the probability of employment. The question is answerable, but it requires a considerably different research design than the question of whether the job-training program is effective. If that research were undertaken, it would be a beginning toward constructing a micro-to-macro model necessary for questions such as that posed by Jencks and associates or that which legislators assume in legislating job-training programs.³

COLLECTIVE DECISIONS

Now I will turn to a very different form of micro-to-macro transition, one that appears to be directly handled through simple aggregation. This is the process of arriving at a collective decision through voting. The micro-level action is casting a vote, and the macro-level outcome is a collective decision arrived at through counting the votes, together with a decision rule, such as a majority rule. The problem appears straightforward, and application of a simple rational model at the individual level, together with aggregation and application of a decision rule, models the process. At the micro-level each individual has a preference order, and this preference order leads to a vote. The micro-to-macro transition occurs through counting of votes and application of a decision rule to produce a macro-level election outcome. Figure 6.11 shows these relations.

So far, so good, but matters are not so simple. Suppose at the macro level we have the following relation: In an election system with a plurality decision rule, a contest between candidates H and J leads to an outcome in which J wins, as shown in figure 6.12. This could be studied at the micro level, as polls do, by eliciting preferences of a sample of prospective voters, aggregating them, and predicting the election outcome. Now suppose we add another candidate, say R, to give an H, J, R contest. One would suppose that the macro-level relation would now be either (a) the

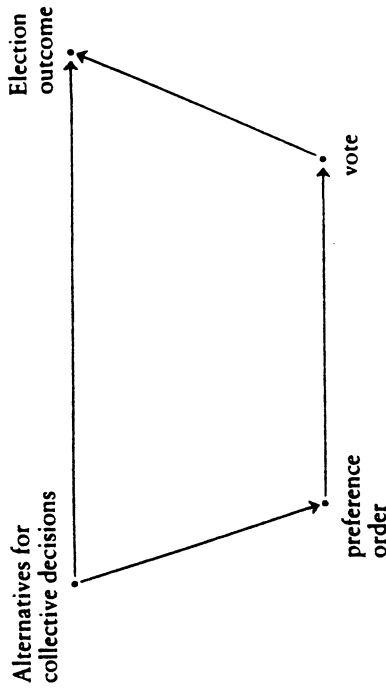


FIG. 6.11

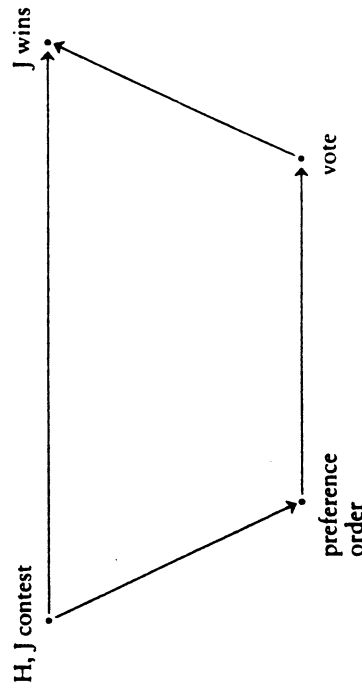


FIG. 6.12

H, J, R contest leads to election of J, as before, or, (b) if R were higher than J in a sufficient number of the preference orders, election of R. However, as Arrow proved in a dissertation written at the University of Chicago, which later became famous as the Arrow impossibility theorem, it is quite possible that H would win, as indicated in figure 6.13—and that there is *no* method of aggregating votes, no decision rule, that can prevent such a possibility (Arrow 1952).

As the letters I have used indicate, with H for Harold, J for Jane, and R for Richie, the 1983 mayoralty election in Chicago is probably an example of this. In a contest between Harold, Jane, and Richie, Harold was the winner, whereas a contest between Harold and Jane alone would

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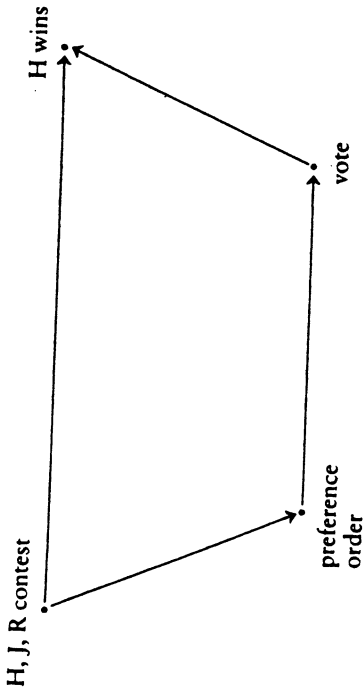


FIG. 6.13

likely have resulted in Jane as winner. The addition of Richie, an "irrelevant alternative" who did not win in the three-way contest and would likely not have been preferred by a majority in a two-way contest with Jane, changed the outcome from Jane to Hatold.

This illustrates a different problem of micro-to-macro transition. The difficulty lies not with the social scientist's model of the process, for in both the two-way and the three-way contest sample surveys eliciting preferences, followed by aggregation and application of the decision rule to be used in the election, would predict the outcome. It lies, rather, with the political institution itself, which produces decision outcomes at a macro level that do not obey the axioms of rationality but are intransitive. A might be collectively preferred (i.e., win in a collective decision outcome) over B and B collectively preferred to C, but then in a turn-around C might be collectively preferred to A. The difficulty, in this case, concerns the micro-to-macro transition produced by the political institution, the decision rule. Different decision rules produce different kinds of collective "irrationalities." For example, in a Hare system, such as that used for election of the Council of the University Senate at the University of Chicago, Brams showed that the following relation can hold: In a contest between A, B, and C, an increase in attractiveness of A can lead to a change in the outcome from A winning to B winning—indeed a perverse result (Brams 1982). Figure 6.14 shows this diagrammatically.

It can be shown that the fault with the political institutions that produce the macro-level outcome from micro-level actions lies in the kind of individual action generated, usually a vote. A vote, as an all-or-nothing action, extracts too little information from the individual about *order* of preference and *intensity* of preference—and until now, no institution has

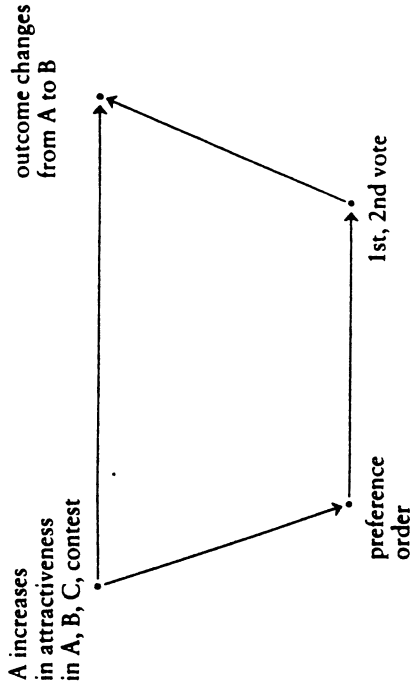


FIG. 6.14

been found which extracts sufficient information about order and intensity of preference that the micro-to-macro transition is freed from the faults I have described—although some institutions have been devised which contain fewer of the faults than do those most commonly in use.

CONCLUSION

I have tried to do several things in this essay:

- (1) to suggest the central importance of a proper model of micro-to-macro transition for using micro-level data to study the macro-level or system-level relations that constitute a major portion of social theory;
- (2) to show extensive and widespread failure to develop appropriate models for the micro-to-macro transition in a wide range of phenomena, from assortative marriage by age to occupational mobility;
- (3) to argue that the neoclassical economic theory of perfect market exchange systems constitutes a model for the micro-to-macro transition, although the model is appropriate only for an idealized social system with complete communication;
- (4) to show that using the conceptual framework of a market but with certain modifications other micro-to-macro transitions may be successfully made—as, for example, in marriage markets, labor markets, and other matching markets;

- (5) to point out that the micro-to-macro transition in certain areas, such as escape panics and placement of trust, may be built on a model of individual rational behavior but without markets or exchange;
- (6) to make a start toward specifying the kind of data needed for making the proper micro-to-macro transition for such problems as the effect of the educational level of the society (or a subgroup in it) on income distribution or unemployment; and
- (7) to show that comparable micro-to-macro problems can be found for another area—that is, collective decisions using a formal decision rule—although in this case the defect lies in the institution itself rather than in the social scientist's model of the transition.

The question remains, where does that leave us? Are there any general directions we can pursue in developing appropriate models of the micro-to-macro transition and in designing research that will aid in making that transition? I believe the answer is yes, pursuing a path that I alluded to earlier, a path suggested in the discussion of marriage markets, panic, placement of trust, and occupational mobility. To embark on that, however, would require another chapter. I will end simply by asserting that these examples taken together suggest a general direction toward solving this problem.

NOTES

1. This last point may be somewhat obscure. A model in which men propose, choosing from among the total set of women available, whereas women choose from among the subset of men who propose, will give different predictions than one in which women propose. Thus with appropriate data the two models with different structures of the process can be compared for their predictive power.
2. There is another point as well. This institution was established by the hospitals principally to reduce the extra transaction costs they incurred through bilateral negotiations. The algorithm used gives that outcome, among all possible stable outcomes, that is most favorable to the hospitals and least favorable to the applicants. It is not clear that applicants are better off through introduction of this institution than they were before its introduction. This exemplifies the fact that social institutions do not emerge in a power-irrelevant way but depend upon the distribution of power prior to their introduction.
3. It is sometimes argued that only macro-level research (i.e., to see whether unemployment is actually reduced by a job-training program) can answer the questions. Such research, however, constitutes a very crude instrument. It seems possible that appropriately designed surveys, which traced not merely the job-training enrollee into a job but also traced the former occupancy of that job, first determining if another occupant was displaced, then, if so, continuing to determine the prior occupancy of the job taken (if any) by the displaced person, and so on.

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