



**Micromotives
and
Macrobehavior**

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I WAS INVITED once to give a lecture to a large audience; the program was to begin at 8:00 in the evening. I followed my escort into the building through the stage entrance and stood in the wings as a microphone was put around my neck. I could see the first dozen rows: nobody had arrived. I assumed that 8:00 meant 8:15, as it might at an academic gathering, and was puzzled when my host walked on stage, nodded to the rows of empty seats, and went through the motions of introducing me. Resisting slightly, I was pushed gently out of the wings and toward the rostrum.

There were eight hundred people in the hall, densely packed from the thirteenth row to the distant rear wall. Feeling a little as though I were addressing a crowd on the opposite bank of a river, I gave my lecture. Afterwards, I asked my hosts why they had arranged the seating that way.

They hadn't.

There were no seating arrangements and no ushers. The arrangement was voluntary, and could only reflect the preferences of the audience. What are we to suppose those preferences were?

It is possible that everybody preferred the whole audience to pack itself into the two dozen rows toward the rear, leaving the first dozen vacant. But, except for any example he set, nobody controlled where anybody else sat. People did not vote with their bottoms on a seating plan. All they did was to choose where to sit from among the available seats they could see as they scanned the hall while walking down the aisle.

Can we guess what policy people followed in choosing their seats? I should add that, as far as I could tell, nothing differentiated the people in different rows. People toward the front or rear did not seem to be older or better dressed or predominantly male or female. Those in the front—the thirteenth

row—may have seemed more attentive than the rest but they probably knew that, even at that distance, I could see their eyelids droop or their heads nod, and were motivated to stay a little more alert.

Curious as I was, I neglected to ask my hosts about the order in which the different rows were filled. Did they fill in sequence from back to front? Did people distribute themselves at random among the rearward two dozen rows? Or did the first arrivals fill the thirteenth row, later arrivals filling the rows in sequence toward the rear? That last is improbable: it would be a coincidence if the earliest arrivals had chosen a forward boundary that would ultimately hold, densely packed, exactly the number of people who showed up. The dynamics had to be consistent with the populating of a compact area by people who could not know how many would be arriving later.

There are several reasons we might interest ourselves in what it is that those people were doing, or thought they were doing, or were trying to do, when they seated themselves in that way. One is that we do not like the result; we prefer they all be in the first twenty-four rows, not the last twenty-four, or distributed over the whole auditorium. If we want to change the pattern with a minimum of organization, interfering as little as possible with the preferences of the audience, we need to know whether we can subtly change their incentives or their perceptions of the auditorium so that they will “voluntarily” choose a better seating pattern.

And before we do any such thing we ought to know whether the audience itself likes the seating arrangement that it chose, and whether the fact that they chose their seats as they did is evidence that they must be satisfied with the outcome.

A second reason for interest is that there may be something about this process that reminds us of other situations in which people locate themselves voluntarily in some pattern that does not possess evident advantages even for the people who by their own choices form the pattern. Residential location is an

example. This laboratory experiment in the auditorium can give us hints of what to look for in other situations.

My immediate purpose in inviting you to speculate on the motives that led to that seating pattern is neither to develop a handbook of auditorium management nor to draw analogies with residential choice or the behavior of crowds or the filling of parking lots. It is to give a vivid example of what this book is about. What this book is about is a kind of analysis that is characteristic of a large part of the social sciences, especially the more theoretical part. That kind of analysis explores the relation between the behavior characteristics of the *individuals* who comprise some social aggregate, and the characteristics of the *aggregate*.

This analysis sometimes uses what is known about individual intentions to predict the aggregates: if we know that people entering an auditorium have a sociable desire to sit near somebody but always to leave one empty seat between them, we can predict something about the pattern that will appear when the entire audience has arrived. Alternatively this kind of analysis may do what I invited you to do—to try to figure out what intentions, or modes of behavior, of separate individuals could lead to the pattern we observed. If there are several plausible behaviors that could lead to what we observed, we can look for evidence by which to choose among them.

There are easy cases, of course, in which the aggregate is merely an extrapolation from the individual. If we know that every driver, on his own, turns his lights on at sundown, we can guess that from our helicopter we shall see all the car lights in a local area going on at about the same time. We could even get our compass bearings by reflecting that the cascade of lights on the Massachusetts Turnpike will flow westward as dusk settles. But if most people turn their lights on when some fraction of the oncoming cars already have their lights on, we'll get a different picture from our helicopter. In the second case, drivers are responding to each other's behav-

ior and influencing each other's behavior. People are responding to an environment that consists of other people responding to *their* environment, which consists of people responding to an environment of people's responses. Sometimes the dynamics are sequential: if your lights induce me to turn mine on, mine may induce somebody else but not you. Sometimes the dynamics are reciprocal: hearing your car horn, I honk mine, thus encouraging you to honk more insistently.

These situations, in which people's behavior or people's choices depend on the behavior or the choices of other people, are the ones that usually don't permit any simple summation or extrapolation to the aggregates. To make that connection we usually have to look at the *system of interaction* between individuals and their environment, that is, between individuals and other individuals or between individuals and the collectivity. And sometimes the results are surprising. Sometimes they are not easily guessed. Sometimes the analysis is difficult. Sometimes it is inconclusive. But even inconclusive analysis can warn against jumping to conclusions about individual intentions from observations of aggregates, or jumping to conclusions about the behavior of aggregates from what one knows or can guess about individual intentions.

Return to that audience of mine and speculate a little on the motives that might lead people to sit as they did. (We needn't assume that they all had the same intentions.) What are some plausible conjectures—alternative hypotheses—about what it is that those people were doing that could lead to the result I described? How do we evaluate the result in the light of each hypothesis? How might we influence the result, according to different hypotheses? How much leeway does each hypothesis allow for the role of chance, or architecture? And can we investigate the several hypotheses, to choose among them, or to reject them all and keep looking?

An obvious possibility is that everybody likes to sit as close to the rear as possible. The earliest arrivals get to sit farthest to the rear; late arrivals can wish they had come earlier,

but there's no way to improve on the outcome for the whole audience by switching people around because for everybody we might switch to the rear there would be somebody who had to go forward. Blocking off the last dozen rows would translate them all a dozen seats forward, if that's where we want them.

A second possibility, not the same thing, is that everybody wants to sit to the rear of everybody else—not to the rear of the hall, just behind the other people. (Maybe they like to get out first afterward.) They may prefer everybody else to be as far forward as possible, so they, too, can be as far forward as possible, still staying behind everybody. To do that the early arrivals sit far enough back to make allowance for later arrivals, who then sit behind them, not forward; or, if the early arrivals attribute the same behavior to those who will come later, they have to choose the row farthest to the rear or people will crowd in behind them. Again, blocking off the last dozen rows will translate them all forward, if that's where we want them, and maybe that's where they'd like to be. They just didn't get there.

A third possibility is that everybody wants to sit where he is close to people, either to be sociable or to avoid being conspicuously alone. If the first few arrivals happen to sit toward the rear, later arrivals will congregate there until the populated area has reached the back. From then on there's no room except toward the front, and to be near people the last arrivals fill the rows immediately forward of those who are already there. If we could get the first few people to sit toward the front, the same process would lead to the reverse result: late arrivals, finding the front full, would fill the rows immediately behind. Either way the early arrivals get surrounded and everybody is bunched. But in one case they are sitting down front and in the other toward the rear. We may like one result better. Or they may like it better.

A fourth possibility is that everybody likes to watch the audience come in, as people do at weddings. To avoid craning

their necks and being seen staring, they sit as far to the rear as possible and watch as people walk by and down the aisle. Once the audience is seated there is no advantage in sitting to the rear—either to the rear of the other people, or to the rear of the auditorium. If we could estimate the size of the crowd and block off the back rows, everybody could indulge his sightseeing and be twelve rows closer to what's going on, and there wouldn't be that embarrassing moat between the speaker and the audience. Or if we had people enter from the front instead of the rear, the early arrivals could combine better seats in front with the same opportunity to watch later arrivals come in.

Still another hypothesis is that most members of the audience developed their seating habits in other times and places, where they found disadvantages in sitting down front. Without thinking about it, they sat toward the rear as they always do, later realizing perhaps that there was no teacher to call on students in the front row and that they could just as well have sat forward and seen and heard better. And so forth. We could even propose that people are merely tired and take the nearest vacant seat when they enter the room. But that behavior would have to be coupled with a rule of decorum—that the first person in any row must go midway between the two aisles and the next people must move alongside to minimize the climbing over—for this “minimum effort” hypothesis to give us the result we observed.

There is one hypothesis that I find interesting because it is so minimal, yet sufficient. This is that nobody cares where he sits, as long as it's not in the very front—not in the first occupied row. Out of two dozen rows that might be partially filled, a person is indifferent among 23 of them. He just does not want to sit in the first one.

Actually, everybody may want to sit as far *forward* as possible, subject to the single proviso that he not be in the first occupied row. To be on the safe side, and not knowing how large the audience will be, people sit toward the rear; as it

begins to look as though most of the audience has arrived, people will climb over seated people to occupy empty seats in the crowded section rather than enter that vacant row just in front of everybody else.

Somebody, of course, ends up sitting in front of everybody. And they might all be just as happy, or happier, if the entire audience were shifted 12 rows forward. The people in the other 23 rows surely would prefer to have the whole crowd shifted forward.

An even weaker hypothesis is that people don't even mind being in the very first occupied row as long as the rows immediately behind them are filled, so they are not conspicuously down front by themselves. That can lead to the same result.

Purposive Behavior

Notice that in all of these hypotheses there is a notion of people's having preferences, pursuing goals, minimizing effort or embarrassment or maximizing view or comfort, seeking company or avoiding it, and otherwise behaving in a way that we might call “purposive.” Furthermore, the goals or purposes or objectives relate directly to other people and *their* behavior, or are constrained by an environment that consists of other people who are pursuing their goals or their purposes or their objectives. What we typically have is a mode of *contingent behavior*—behavior that depends on what others are doing.

In other sciences, and sometimes in the social sciences, we metaphorically ascribe motives to behavior because something behaves *as if* it were oriented toward a goal. Water seeks its own level. Nature abhors a vacuum. Soap bubbles minimize surface tension and light travels a path that, allowing for different speeds through different media, minimizes travel time. But if we fill a J-shaped tube with water and close the lower end so that the water in the pipe cannot achieve its own level, nobody really supposes that the water feels frustrated. And if we then open the lower end of the tube so that most of the